63-3-5

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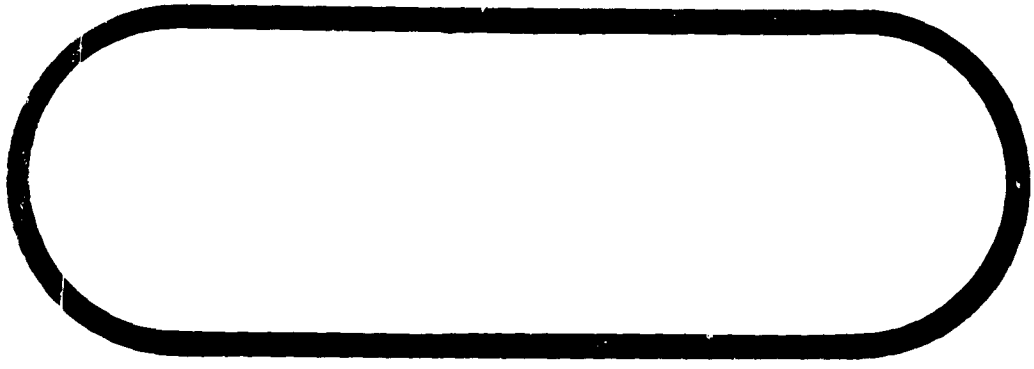

SEATTLE, WASHINGTON

THE BOEING COMPANY

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NUMBER D2-13406, Vol. I

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ACTIVE-CHANGED PAGE

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1.0.0 INTRODUCTION

1.0.0.1 This volume is a compilation of all the test procedures required for completion of the NRA I Test Program.

The test procedures for NRA II, NRA III and NRA IV tests shall be contained in document D2-13406, Volumes II, III and IV respectively.

1.0.0.2 Some of the original tests scheduled for NRA I were never completed; consequently such tests shall be incorporated into NRA IV.

1.0.1 ABSTRACT

1.0.1.1 The complete description of the NRA Program Plan is outlined in document D2-13405, Network Resolution Area (NRA) Test Program Plan, Block Change I. This document describes the purpose and scope of the NRA Program. Detailed descriptions of test organization, test configuration and test objectives are given.

1.0.1.2 All signals will be monitored at the rack level or at MGSE test points provided on the front of the SCN equipment drawers. Parallel inputs are provided for all SCN Command Receive channels at the Patch Panel, to facilitate monitoring of signals received at the nodes. The NRA Instrumentation System shall be used extensively for monitoring test signals. Replay of the instrumentation tapes shall be recorded on oscillograph paper and the results evaluated for use in NRA Test Reports.

1.0.2 NOMENCLATURE

CAL	Calibrate
CCC	Communication Control Console
CCP	Communication Control Panel
CMPG	Command Message Processing Group
CTE	Cable Termination Equipment
DAC	Data Analysis Central
DD/MS	Message Simulator, Digital Data
DDG	Digital Data Group
DPE	Data Processing Equipment
ESA	Electrical Surge Arrestor
EWO	Emergency War Order
HVC	Hardened Voice Channel
INF	Infinite
LCC	Launch Control Console
LCF	Launch Control Facility
LEU	Launch Enable Unit
LF	Launch Facility
LMU	Line Monitor Unit
LSU	Line Selector Unit
MD	Mechanical Decoder
MDU	Mechanical Decoder Unit
MGSE	Missile Ground Support Equipment
MRU	Message Retransmission Unit
MS/CTE	Message Simulator, Cable Termination Equipment
NL	No Load
NRA	Network Resolution Area
OGE	Operation Ground Equipment

PAS	Primary Alert System
P/P	Patch Panel
RTS	Repeater Telephone Set
SCMPG	Status Command Message Processing Group
SCN	Sensitive Command Network
SCNT	SCN Test
SIN	Support Information Network
SMPG	Status Message Processing Group
S&M	Sequence and Monitor
S/N	Serial Number
TCSS	Telephone Connecting & Switching Set
TTE	Telephone Termination Equipment
VAFB	Vandenberg Air Force Base

1.0.3	REFERENCES	
1.0.3.1	Facilities	
	25-33093	Equipment Installation - NRA Lab.
1.0.3.2	Cabling	
	21-50170	Electrical Cable Assemblies (NRA)
	21-52060	Schematic - Cabling, NRA
1.0.3.3	Test Plan	
	MTOR-E-022B Vol. II	Part 2, NRA
	MTOR -E-022B Vol. III	Part 1, DPE and Part 2, CTE
	MTOR-E-022B Vol. IV	Parts 1 and 2, New York Systems
	D2-13405	NRA Test Program Plan, Block Change 1.
	T2-2118	Minuteman Breadboard SCN Tests Conducted at Seattle
1.0.3.4	System	
	D2-4871	Launch Control System Test Program Hardened and Dispersed - Preprototype (NRA)
	D2-5257	Seattle Test Program, Part III, Integration Test Requirements, H&D
	D2-5684 Vol. 1 thru 7	Engineering Development Laboratories Test Program for LCS.
	D2-7401	Underground Cable Procurement and Installation Routing Requirements, Minuteman H&D Operational Squadrons
	D2-9112-1	Launch Operational System Configuration, PPT.
	D2-9112-2	Launch Operational System Configuration, PT.

1.0.3.5	Launch Control Console	
	D2-5450	Model Specifications for Launch Control Console
1.0.3.6	Communications Control Console	
	D2-10778	Model Specifications for Communications Control Console
1.0.3.7	SCN Data Processing Equipment	
	MMSP-C-101A	Model Specifications, PPT LCC
	MATP-C-101A	Acceptance Test Procedure, PPT LCC
	MTM-C-101	Handbook of Operating and Maintenance Instructions, PPT LCC
	MMSP-C-103A	Model Specifications, PPT LF
	MATP-C-103A	Acceptance Test Procedures, PPT LF
	MTM-C-103	Handbook of Operating and Maintenance Instructions, PPT LF
1.0.3.8	SCN Cable Terminating Equipment	
	MMSP-C-102A	Model Specifications, PPT LCC
	MTM-C-102	Handbook of Operating and Maintenance Instructions, PPT LCC
	MATP-C-102/104	Acceptance Test Procedure, PPT LCC/LF
	MMSP-C-104A	Model Specification, PPT LF
	MTM-C-104	Handbook of Operating and Maintenance Instructions, PPT LF
	MMSP-C-110	Model Specification, HVC Repeater PPT.
	MATP-C-110B	Acceptance Test Procedure, PPT HVC Repeater
	MTM-C-110	Handbook of Operating and Maintenance Instructions, PPT HVC.

1.0.3.9	Support Information Network	
	MMSP-I-206	Model Specification, Communications Control Console
	MMSP-I-205	Model Specification, Telephone Set, Wall-Type
	MMSP-I-203	Model Specification, Jack Assembly, Interphone
	MMSP-I-201	Model Specification, LF Telephone Terminal Equipment
	MATP-I-201	Acceptance Test Procedures, LCC/TTE
	MATP-I-201A	Acceptance Test Procedure, LF/TTE
	MTM-I-002	Operating and Maintenance Instructions, PPT SIN
1.0.3.10	Cable Simulators	
	MMSP-T-403B	Model Specification
	MATP-T-403A	Acceptance Test Procedure
	MTM-T-403	Operating and Maintenance Instructions Handbook
1.0.3.11	Support Equipment	
	D2-13404	Handbook of Operating and Maintenance Instructions, Message Simulator, Digital Data (Rework)
	D2-13807	Handbook of Operating and Maintenance Instructions, S&M Signal Simulator
	D2-5678	Master Equipment List - H&D, R&D

TEST 1.1.1.1

1. Title

Functional Test, DC Power Supply, Verification Test.

2. Objectives

2.1 To verify that the voltage and current meters give a true reading.

2.2 To insure that the units are capable of supplying the required power within the specified voltage tolerance.

2.3 To measure the ripple and voltage regulation at the specified load current.

3. Description

3.1 Connect a 30 ampere or 50 ampere load to power supply as required.

3.2 Connect equipment per Figure 1.1.1.1-1.

3.3 Switch load from no load to full load once, from full load to no load while measuring voltage transients and recovery time at output terminals with an oscilloscope with camera attachment.

3.4 Using a shunt, measure full load current and voltage with a differential voltmeter and compare with power supply panel meter current and voltage readings.

3.5 Measure no load and full load ripple across output terminals using an oscilloscope.

3.6 Measure no load and full load voltage with differential voltmeter and determine static regulation.

3.7 Connect battery set and repeat transient measurements.

4. Equipment in Test

4.1 Four Perkins 28 VDC/30 amp power supplies, Model MTR 28-30-23.

4.2 Two Perkins 28 VDC/50 amp power supplies, Model MTR 28-50-13

4.3 Battery Set 25-35469-1.

5. Test Equipment

5.1 Differential Voltmeter, Fluke 801

5.2 30 Amp and 50 amp shunts.

5.3 Oscilloscope - Tektronix 545 with Camera, Model C12

5.4 1500 watt load bank, adjustable for 30 or 50 amps at 28 VDC (Non-inductive).

5.5 Mercury switch.

6. Data Requirements

6.1 Photograph data required in Step 3.2.

6.2 Record information required in Steps 3.3 to 3.5 on M&IR Log.

6.3 Record any unplanned events in M&IR Test Log.

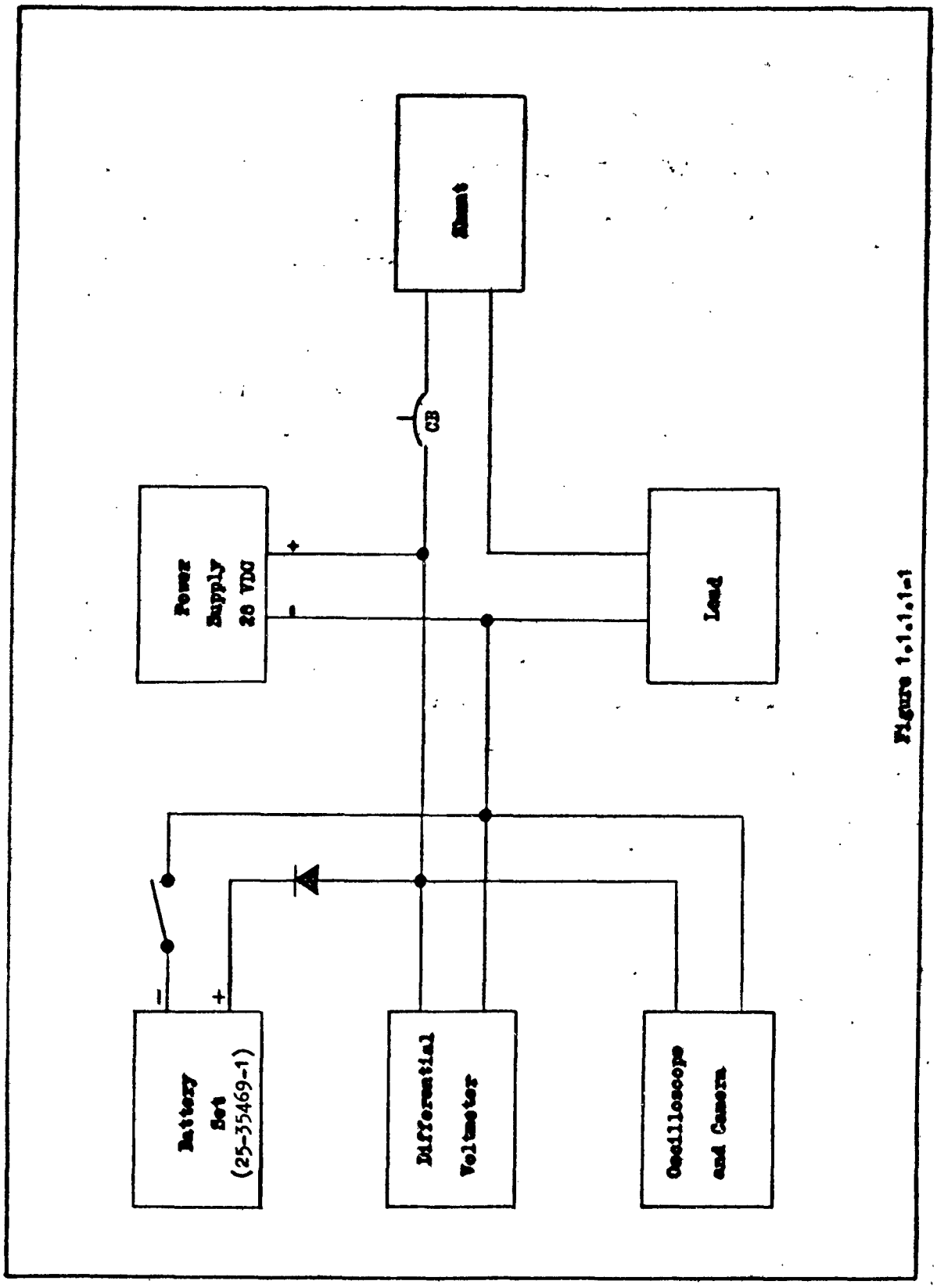


Figure 1.1.1.1-1

TEST 1.1.1.2

1. Title

Post-Installation Functional Test on Intrasite Cabling and Cable Components.

2. Objectives

2.1 To insure that interconnecting cables have been properly installed as shown in 21-50170.

2.2 To determine that cables are fabricated per the prescribed specifications as shown in 21-50170. Check the number and positions of pins in the connectors, connector clocking, size etc.

3. Description

3.1 Connect a continuity tester to pin number 1 at near end of cable and to the corresponding pin at the far end to verify that an open circuit does not exist.

3.2 Repeat step 3.1 for all the remaining pins and shields.

3.3 Connect continuity tester to pin number 1 at the near end and test to all remaining pins and shields at the near end to verify absence of shorts.

3.4 Repeat step 3.3 by connecting the continuity tester to the next pin and testing to all pins and shields to the tester that has not yet been connected, for all remaining pins. Thus, one side of the continuity tester is connected to a number or letter which is being tested and the other lead will be connected to all numbers or letters which are greater than the one being tested.

4. Equipment in Test

4.1 The following cables are to be tested and will be verified per 21-50170 as specified in item 2 of this test.

21-50170-0378	21-50170-0411
-0408	-0366
-0390	-0384
-0414	-0435
-0387	-0393
-0426	-0396
-0429	-0380
-0645	-0456
-0549	-0540
-0555	-0552
-0471	-0633
-0647	-0648

5. Test Equipment Required

5.1 Wheatstone Bridge; Leads & Northrup, Type U

5.2 Multimeter, Simpson 260

6. Data Requirements

Record all data on M & IR Test Log.

TEST 1.1.1.3

1. Title

   SCN Cooling Air Requirements

2. Objectives

   2.1 To determine the cooling air temperature rise through the SCN equipment under variable conditions of static pressure at the air inlet.

   2.2 To determine ambient heat influx contribution to cooling air temperature rise across each SCN rack.

3. Test Description

   The tests will be performed on two groups of SCN equipment: the LCF group, consisting of Figure A 1265, 1213A, and 1213B, and the LF group, consisting of Figure A 1251 and 1228.

   LCF Tests

   3.1 Connect the equipment as shown in Figures 1.1.1.3-1, and 1.1.1.3-3.

   3.2 Using a thermocouple, check the temperature of the cooling air at the air inlet to the LCF/DAC racks. Adjust cooling air temperature to 55 ± 2°F.

   3.3 Record the following temperatures:

   (a) Intake and exhaust air temperature for each rack.

   (b) Power supply drawer temperatures for racks 1213A and B.

   (c) Room temperature.

   (d) Wet-bulb temperature.

   3.4 Using a manometer, monitor inlet air static pressure on each rack. Adjust pressure on each rack to the values given in Table 1.1.1.3-1 (condition 1).

3.5 Program the Message Simulator to transmit a status message on all status lines. All lights on SATG indicator panel OFF. Connect the equipment as shown in Figure 1.1.1.3-5. All switches at CCC must be in the safe position.

3.6 Turn on temperature recording instrument.

3.7 Turn on LCF and record time.

3.8 Measure power input to each rack using a DC wattmeter as shown in Figure 1.1.1.3-3.

3.9 Monitor the cooling air temperature at the rack inlets and outlets for a period of 3 hours, or until exhaust air temperatures stabilize. If outlet temperature exceeds 67 degrees at any time, immediately shut down the LCF/DAC racks.

3.10 Record power input to the racks and then shut down all racks.

3.11 Place the manometer on each rack inlet and adjust the static pressure to the values given under condition 2 in Table 1.1.1.3-1.

3.12 Turn on LCF/DAC racks. Record time.

3.13 Bring racks up to Strategic Alert and measure the power input to each rack.

3.14 Monitor the cooling air temperature for a period of 2 hours, or until the temperatures stabilize. If outlet temperature exceeds 67 degrees at any time, immediately shut down the LCF/DAC racks.

3.15 Record power input to the racks and then shut down all racks.

3.16 If temperatures remain within tolerance for Table 1.1.1.3-1 (Condition 2), repeat steps 12 through 16 for conditions 3 and 4.

LF Tests

3.1 Using a manometer, monitor the inlet air static pressure on the two LF/DAC racks. Adjust pressure on each rack to those given under condition 1 in Table 1.1.1.3-2.

3.2 Monitor temperature at the following points:

(a) Air intake and exhaust ducts for each rack.

(b) Power supply drawer in each rack.

(c) Room temperature.

(d) Wet-bulb temperature.

3.3 Connect the equipment as shown in Figure 1.1.1.3-2. SIN Repeater Telephone Set must be ON. Place racks in Strategic Alert condition.

3.4 Turn on recording thermometer.

3.5 Turn on LF and record time.

3.6 Measure power input to each rack using a DC wattmeter as shown in Figure 1.1.1.3-4.

3.7 Monitor the cooling air temperature at the rack inlets and outlets for a period of 3 hours. If outlet temperature exceeds 67 degrees at any time, immediately shut down the LF/DAC racks.

3.8 Record power input to the racks and then shut down all racks.

3.9 Connect the manometer to the pressure monitor point on each rack inlet and adjust the static pressure to the values given under condition 2 in Table 1.1.1.3-2.

3.10 Turn on LF/DAC racks. Record time.

3.11 Bring racks up to Strategic Alert and measure the power input to each rack.

3.12 Monitor the cooling air temperature for a period of 2 hours, or until the exhaust air temperatures stabilize. If outlet temperature exceeds 67 degrees at any time, immediately shut down the LF/DAC racks.

3.13 Record power input to the racks and then shut down all racks.

3.14 If temperatures remain within tolerance for Table 1.1.1.3-2 (condition 2), repeat steps 9 through 13 for conditions 3 and 4.

4. Equipment in Test

4.1 LCF/BPE Rack A #304 Command Message Processing Group P/N 8323614-501 S/N 0000005

4.2 LCF/BPE Rack B #305 Status Message Processing Group P/N 8323615-501 S/N 0000004

4.3 LCF/CTE Rack #303 Digital Data Group P/N 8323562-501 S/N 0000004

4.4 LF/BPE Rack #402 Command Message Processing Group P/N 8323617-501 S/N 0000005

4.5 LF/CTE Rack #401 Digital Data Group P/N 8323616-502 S/N 0000005

5. Test Equipment Required

5.1 Recording thermometer - Minneapolis-Honeywell Model 153 60P2-x-61

5.2 DC Wattmeter

5.3 Thermometer - Simpson Model 308

5.4 Manometer

5.5 Hygrometer

5.6 Eight copper constantan thermocouples

TABLE 1.1.1.3-1

SCN Equipment Figure A	Static Pressure in Inches of Water			
	Condition 1	Condition 2	Condition 3	Condition 4
1265	0.13	0.07	0.03	
1213 A	0.35	0.21	0.10	
1213 B	0.48	0.34	0.14	

TABLE 1.1.1.3-2

SCN Equipment Figure A	Static Pressure in Inches of Water			
	Condition 1	Condition 2	Condition 3	Condition 4
1251/1279	0.42	0.36	0.29	
1228	0.53	0.42	0.35	

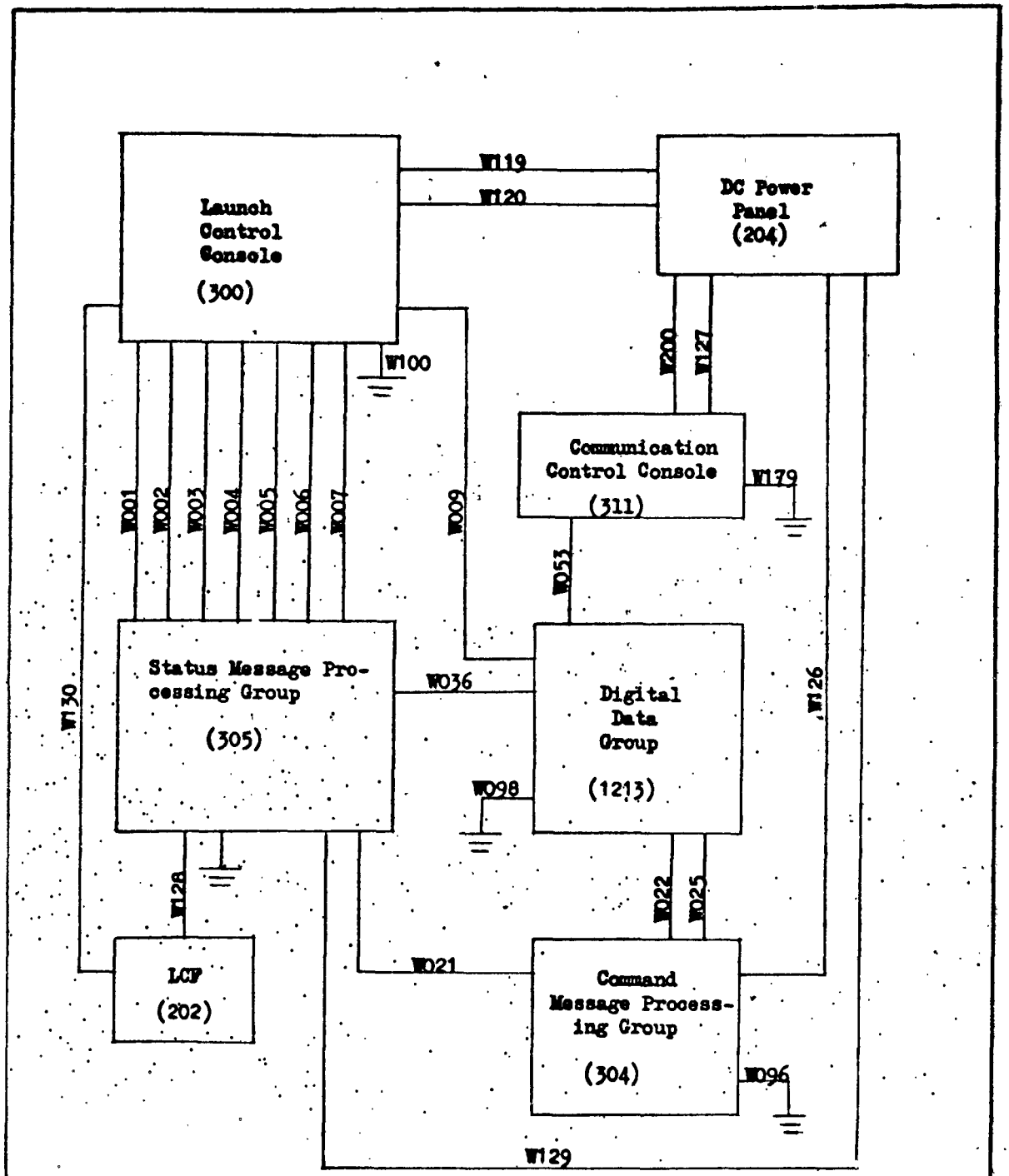


Figure 1.1.1.3-1

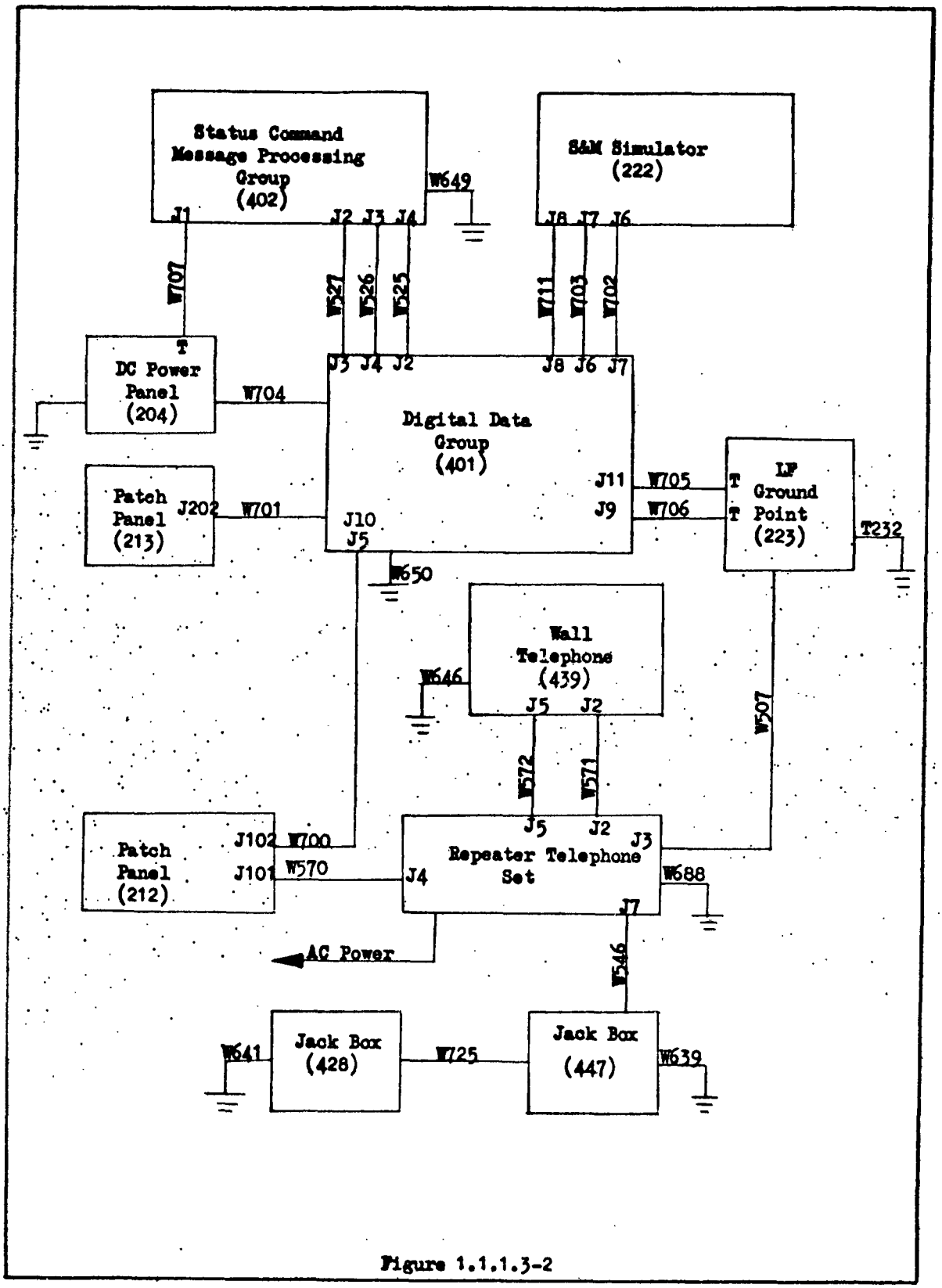


Figure 1.1.1.3-2

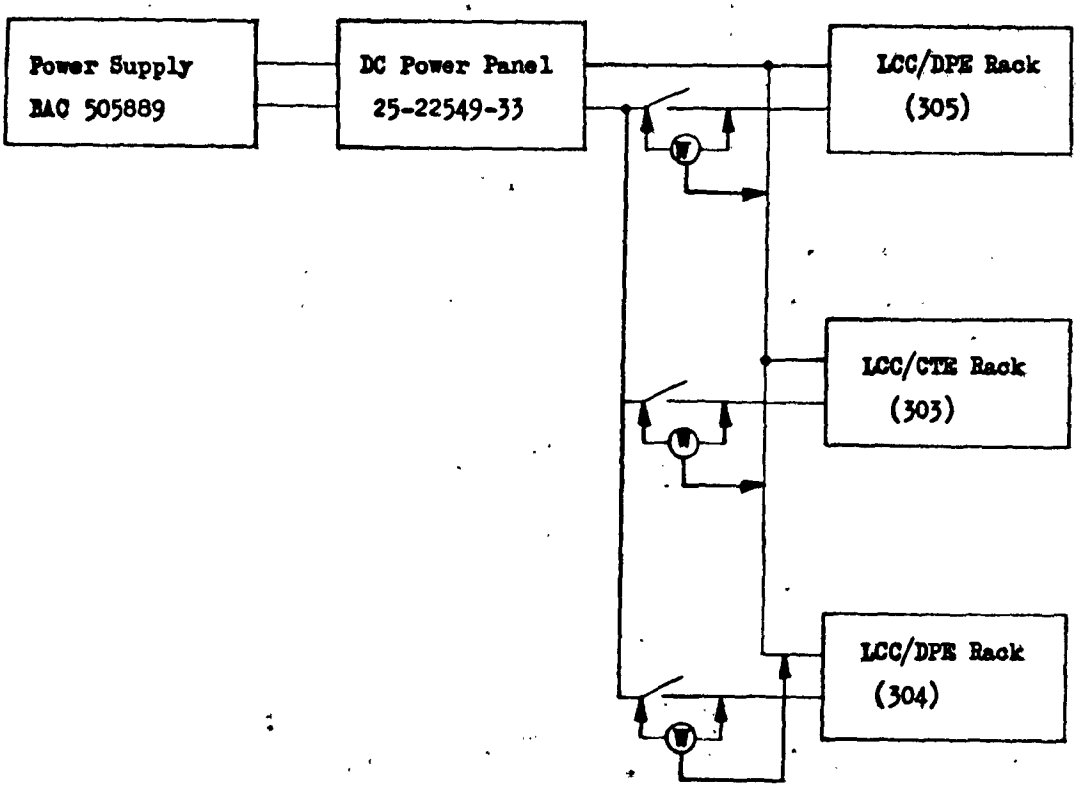


Figure 1.1.1.3-3

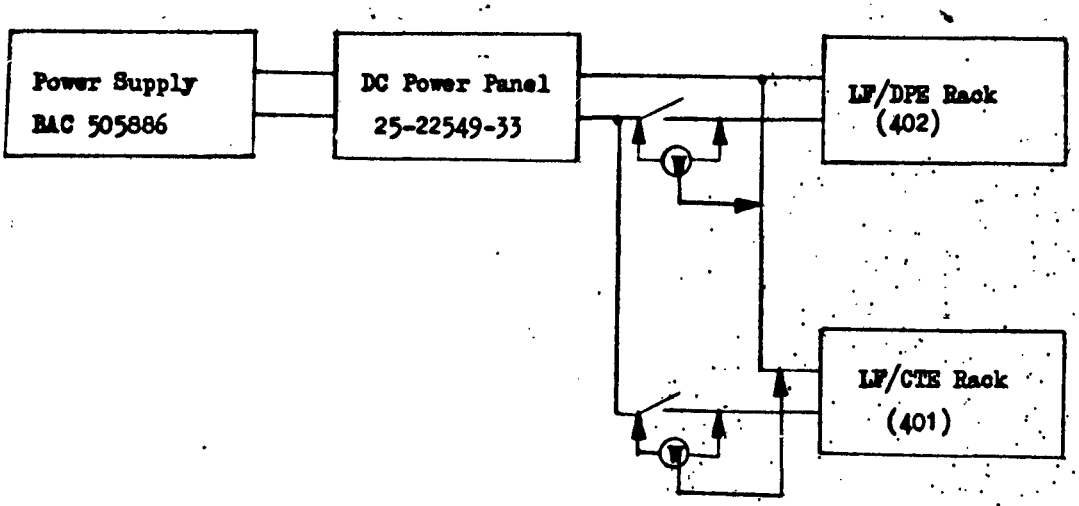


Figure 1.1.1.3-4

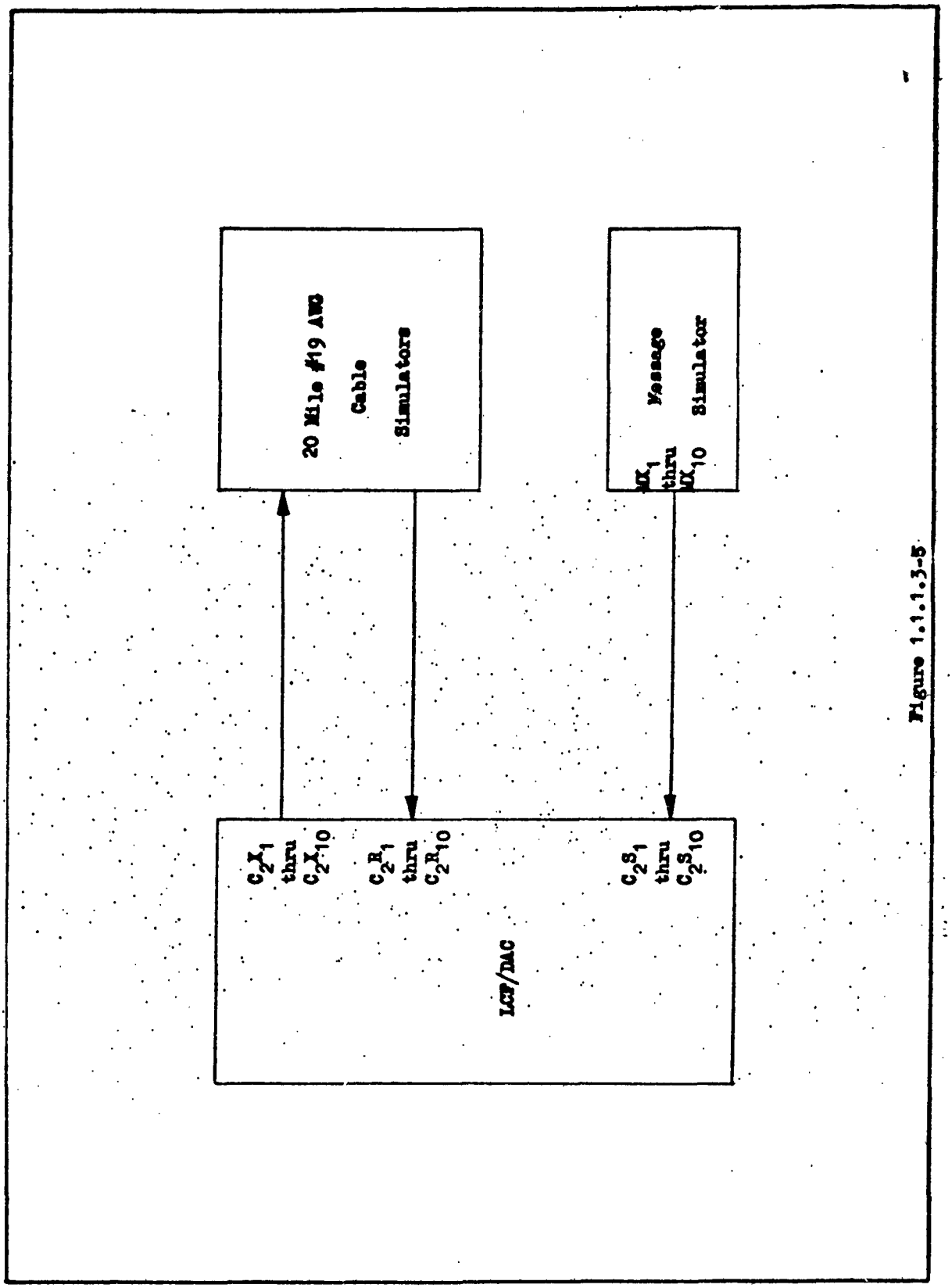
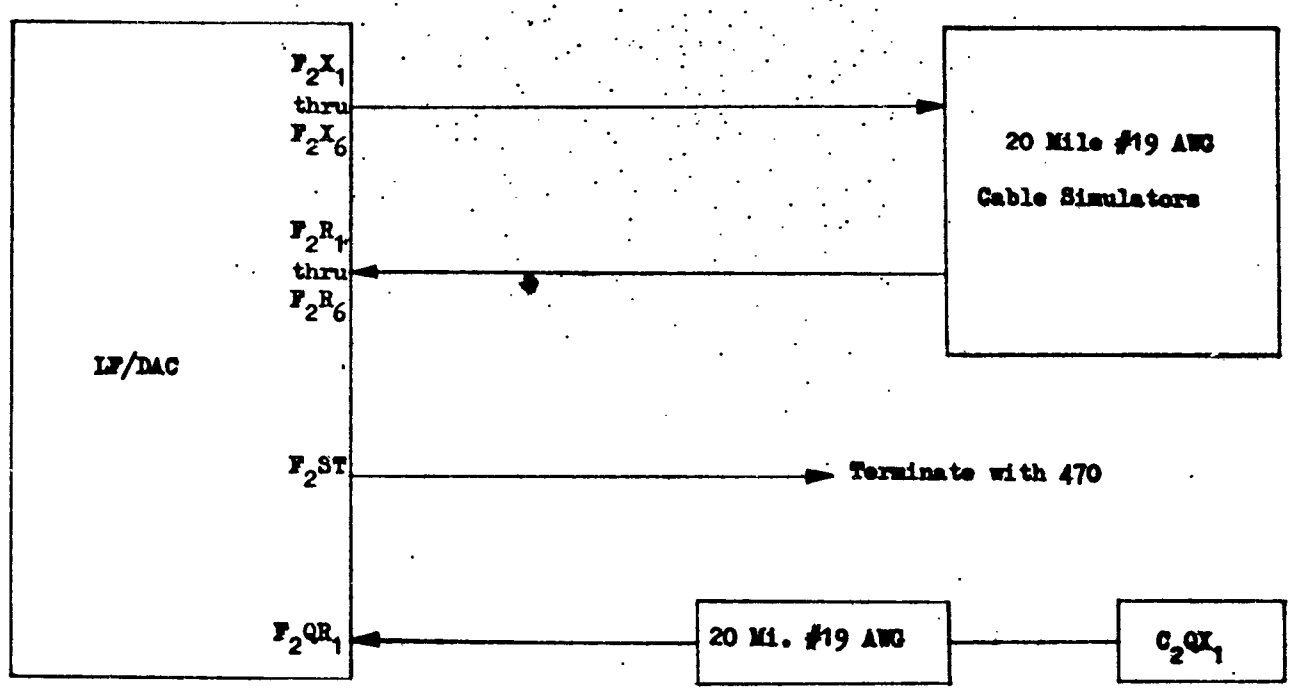


Figure 1.1.1.3-5



NOTE: SIM Repeater Telephone Set OH

Figure 1.1.1.3-6

TEST 1.1.2.1

1. Title

   Connection of LCC to DC Power.

2. Objectives

   2.1 To insure that the 28 VDC power will be applied at the proper cable terminals before the cable is connected to the LCC.

   2.2 To determine the voltage and current at the interface.

   2.3 To insure that voltages at the LCC to DPE interface are within specified tolerances.

3. Description

   3.1 Before connecting cables W119 and W120 to the LCC measure the voltages on each pin referenced to point A''' (ground). Pin 3 of W119 and Pins 6 and 10 of W120 should be at +28 VDC. The voltages on all other pins should be 0.

   3.2 Open circuit breakers CB5 and CB17 and connect W119 and W120 to the LCC as shown in Figure 1.1.2.1-1.

   3.3 Close breaker CB5 and monitor the voltage at point B'; adjust to 28 VDC is required.

   3.4 Monitor the voltage between points A' and B' with a differential voltmeter.

   3.5 Close breaker CB17 and monitor the voltage at point B''.

   3.6 Monitor the voltage between points A'' and B'' with a differential voltmeter.

   3.7 Measure the ripple at points B' and B'' with the oscilloscope.

4. Equipment in Test

   4.1 Launch Control Console 25-24172-11

4. Equipment in Test

4.1 Launch Control Console

5. Test Equipment Required

5.1 Differential voltmeter

5.2 Oscilloscope, Tektronix 545A

5.3 Oscilloscope camera

5.4 Calibrated shunts (12 amp maximum current at 28V)

6. Data Requirements

6.1 Record all data in the Test Log.

6.2 Photograph the ripple in step 3.1.

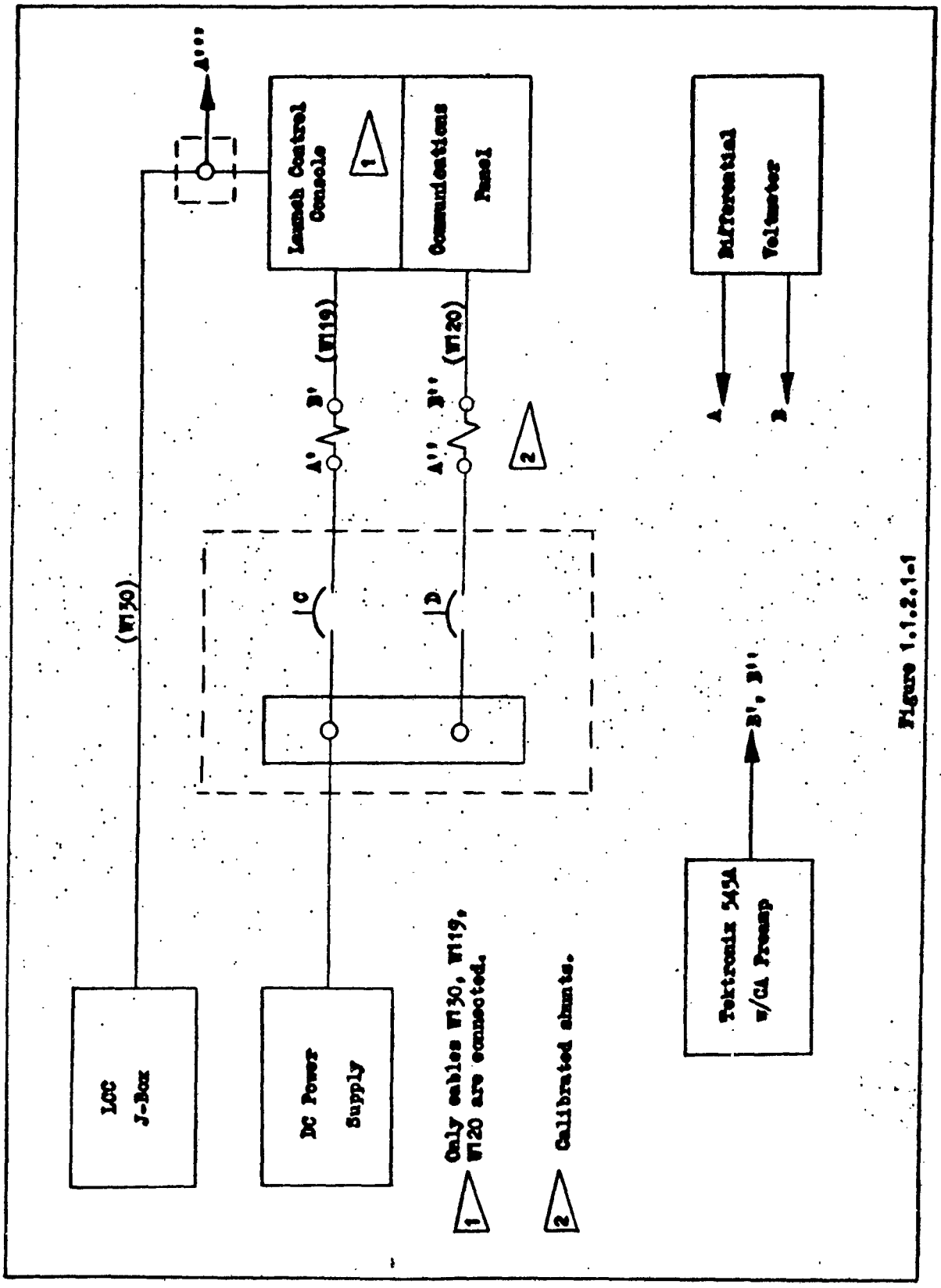


Figure 1.1.2.1-1

TEST 1.1.2.2

1. Title

LCC, Status Indicator Lamp Test

2. Objectives

2.1 To verify the lamp-test functions of the LCC.

2.2 To determine the current during lamp-test.

3. Description

3.1 Connect the equipment as shown in Figure 1.1.2.1-1 except cable W120 which may be disconnected.

3.2 Measure the voltage between points A' and B' to determine the current. Measure the voltage between points A''' and B'.

3.3 Operate all lamp test switches in sequence, repeating step 3.2.

4. Equipment in Test

4.1 Launch Control Console 25-24172-11

5. Test Equipment Required

5.1 Differential voltmeter Fluke 801

5.2 Calibrated shunt. (12 Amp. maximum).

6. Data Requirements

Record all data in the Test Log.

TEST 1.1.2.3

1. Title

   LCC, Audible Alarm Test and Reset

2. Objectives

   2.1 To insure that the ALARM TEST and ALARM reset functions are operative.

   2.2 To measure the current and voltage at the LCC power input during activation of the alarms.

   2.3 To measure the ripple on the 28 volt input during activation of each alarm.

3. Description

   3.1 Connect the equipment per Figure 1.1.2.3-1.

   3.2 Activate ALARM #1 and measure voltage between A' and B', then A''' and B'. Monitor the ripple between A''' and B' with an oscilloscope.

   3.3 Press the ALARM reset button and verify that the audible alarm ceases.

   3.4 Repeat steps 3.2 and 3.3 for ALARM #2.

   3.5 Repeat steps 3.2 and 3.3 for ALARM #1 and #2 simultaneously.

4. Equipment in Test

   4.1 Launch Control Console 25-24172-11

5. Test Equipment Required

   5.1 Differential voltmeter, , Fluke 801

   5.2 Oscilloscope, Tektronix 545A

   5.3 Oscilloscope camera

   5.4 Calibrated shunt (12 amp max. at 28 VDC)

6. Data Requirements

   6.1 Record all data in the Test Log.

   6.2 Three oscilloscope photographs are required per steps 3.2, 3.3 and 3.4.

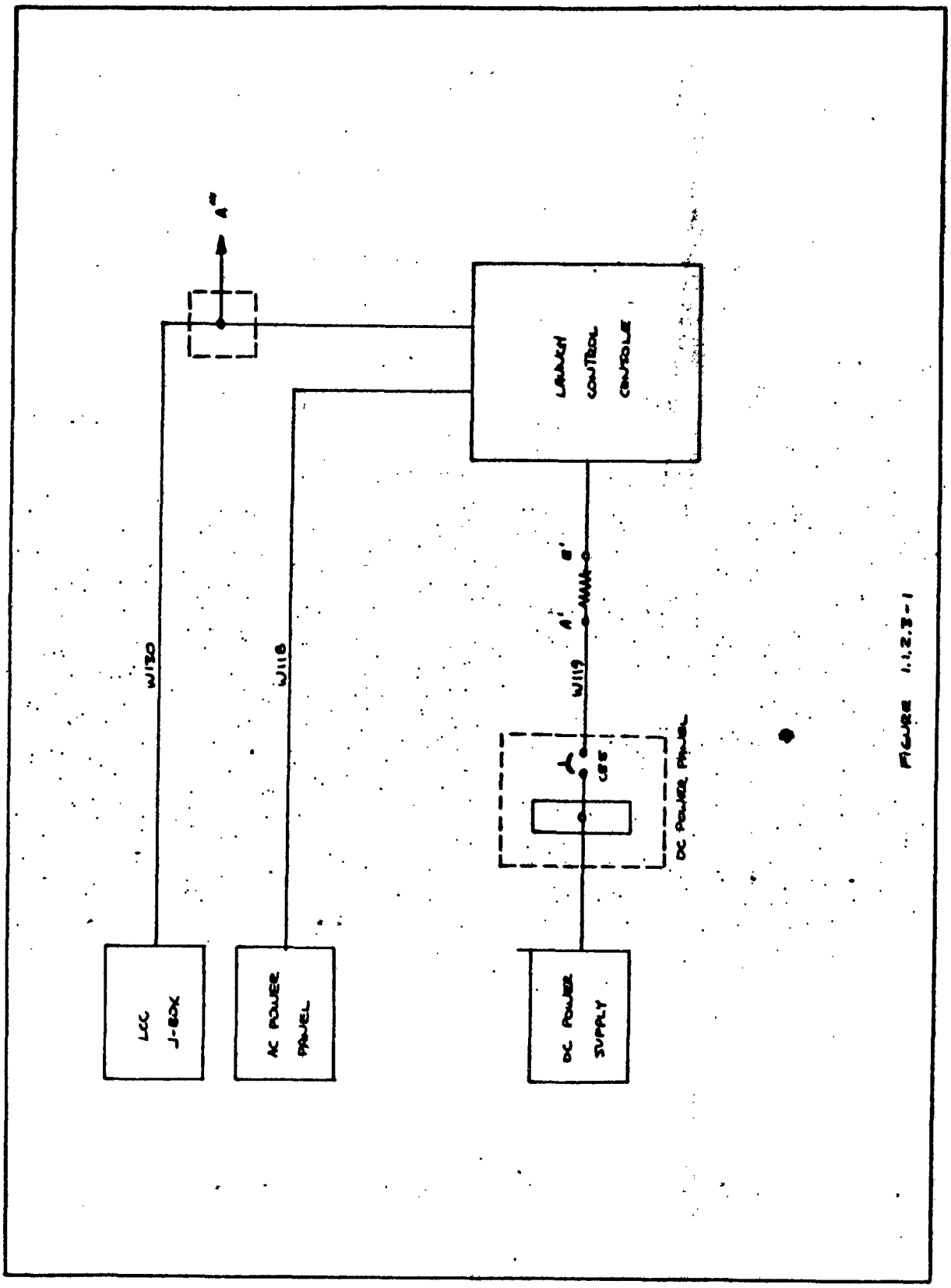


FIGURE 1.1.2.3-1

TEST 1.1.2.4

1. Title

   LCC, Encoder Switches

2. Objectives

   2.1 To verify the correct codes exist in the Breakwire Encoder.

   2.2 To verify operation of the Program Controls and Command Controls.

   2.3 To determine the resistance of the signal path from the encoder output to the common, measured at the external conductor.

3. Description

   3.1 Connect the equipment per Figure 1.1.2.4-1

   3.2 With the LAUNCH & INHIBIT Levers in the BST position and the Program Controls OFF, check for continuity between pin 68 and pins 2-57 of Cable W006. Use Cable Breakout Box mounted behind Rack 305.

   3.3 Turn both the LAUNCH Lever and the Co-op switch within two seconds to the LAUNCH position and check for continuity between pin 68 and pins 2-57 which should correspond to drawing 29-24771 (LCF#2).

   3.4 Release the LAUNCH switches to their normal positions.

   3.5 Turn the INHIBIT Lever to the INHIBIT position and again check bits 1-56 for continuity per drawing 29-24771.

   3.6 Return the INHIBIT switch to the CODE USED position.

   3.7 Sent TEST command with LF address #2. Again check continuity of pins 9-15 per drawing 29-24771.

   3.8 Repeat step 3.7 for LF addresses 3 through 11.

   3.9 Repeat step 3.7 for SCNT and CAL. Verify that the Program Control moves off the CAL position automatically.

   3.10 Check the resistance of randomly selected encoder switches.

4. Equipment in Test

4.1 Launch Control Console 25-24172-11

5. Test Equipment Required

5.1 Continuity Tester

5.2 Ohmeter

6. Data Requirements

Record all data in the Test Log.

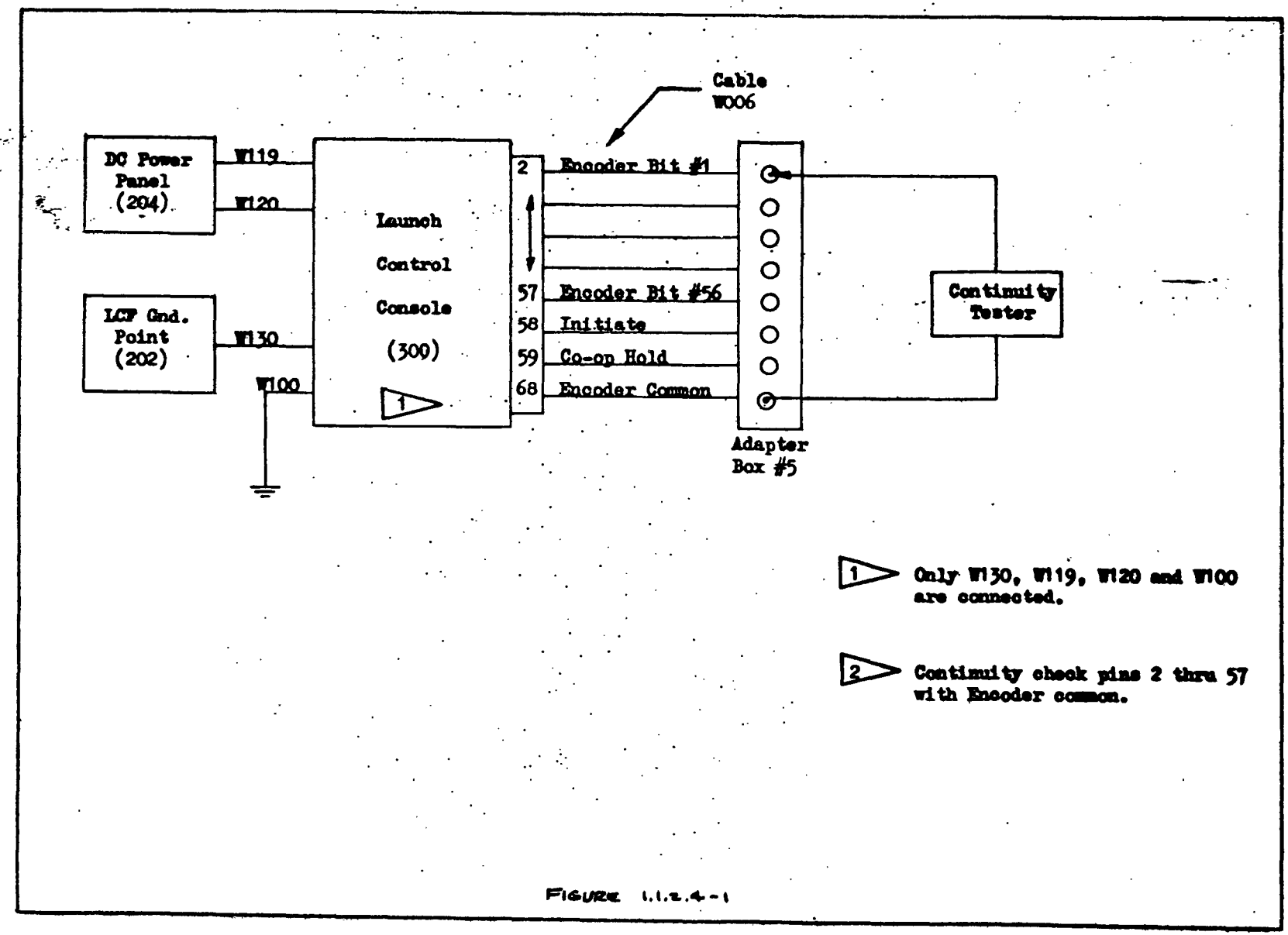


FIGURE 1.1.2.4-1

TEST 1.1.3.1

1. Title

   SIN Frequency Response, VAFB Configuration

2. Objective

   To determine the response of the SIN Transmission path using the attenuator employed at VAFB.

3. Description

   3.1 Connect the equipment per Figure 1.1.3.1-1.

   3.2 Adjust the oscillator to 3 dbm (V_1) at 1000 cps. Measure the output (V_2).

   3.3 Repeat the measurements at 300, 500, 750, 1000, 1500, 2000 and 3000 cycles/second. The input should be adjusted to 3 dbm at each frequency.

4. Equipment in Test

   4.1 Attenuator-Balanced, Assy of 29-26032-1

   4.2 Patch Panel & Cable Simulator 25-29327-1

   4.3 Repeat Coil Assy. EED&I 71-1/SK51

   4.4 Equalizer Assy EED&I 71-1/SK52

   4.5 One Mile Simulator Assy EED&I 71-1/SK50

5. Test Equipment Required

   5.1 Audio Oscillator, 600 ohm balanced.

   5.2 Audio VTVM, 0 dbm at 1 mv across 600 ohms

   5.3 Resistors, 20 ohm

6. Data Requirements

Record all data in the Test Log.

7. References

Coordination Sheet SRS-43-10/114 (1/6/62)

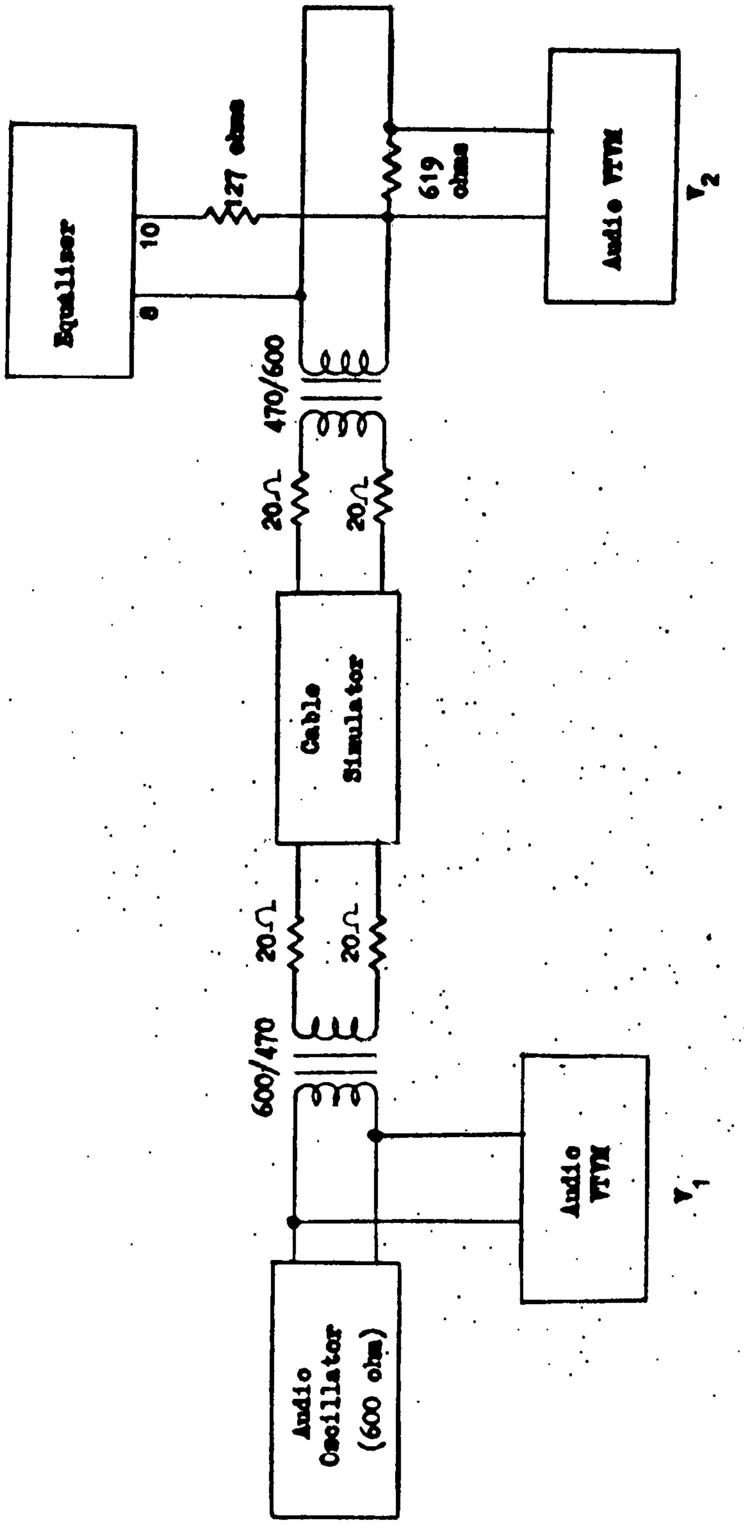


Figure 1.1.3.1-1

TEST 1.1.3.2

1. Title

   LCF/DDG SIN Speech Transmit Channels

2. Objectives

   To verify that the channel frequency response is within specified tolerance.

3. Description

   3.1 Connect the equipment as shown in Figure 1.1.3.2-1.

   3.2 Remove cables at J7, J10 and J13. Leave these cables disconnected during this test.

   3.3 Connect 600 ± 30 ohm impedance audio oscillator, a frequency counter and a VTVM to input point indicated in Table 1.1.3.2-1.

   3.4 Connect 470 ± 24 ohm resistor and a VTVM to output point indicated in Table 1.1.3.2-1.

   3.5 Assure that transformers are connected for 470 ohm output impedance.

   3.6 Perform tests in Table 1.1.3.2-1 and observe indicated outputs.

4. Equipment in Test

   LCF/Digital Data Group OA-3541/GYK-1

5. Test Equipment Required

   5.1 Audio Oscillator - Hewlett-Packard 200C

   5.2 VTVM - Hewlett-Packard 400C

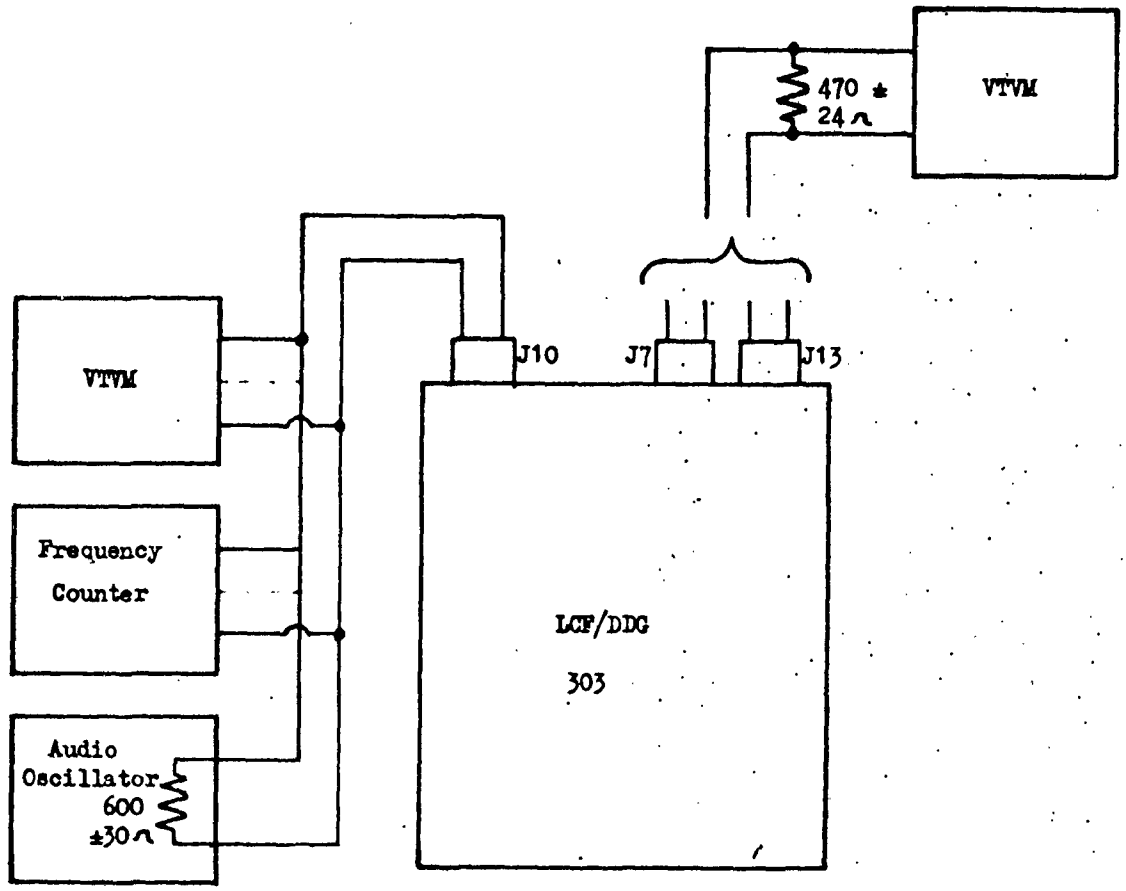
   5.3 Frequency Counter - Berkeley

6. Data Requirements

   Record all data in Test Log.

SIN Speech Transmit						
Input Conditions				Monitor Points		
Test Number	Input Points	Input Frequency	Input Level	Output Points	Output Level	Remarks
1	J10-2, -3	1000 Sweep oscillator from 300 to 3000 cps.	13 dbm	J13-25, -26	0 to 4 dbm ±1 dbm of the output at 1000 cps.	Add 1.06 dbm to output reading when measuring across 470 ohm load.
	J10-2, -3		13 dbm	J13-25, -26		
2	J10-4, -5	Same as Test 1.	Same as Test 1.	J13-27, -28	Same as Test 1.	
3	J10-6, -7			J13-29, -30		
4	J10-8, -9			J13-31, -32		
5	J10-10, -11			J13-33, -34		
6	J10-13, -13			J7-25, -26		
7	J10-14, -15			J7-27, -28		
8	J10-16, -17			J7-29, -30		
9	J10-18, -19			J7-31, -32		
10	J10-20, -21	Same as Test 1.	Same as Test 1.	J7-33, -34	Same as Test 1.	

Table 1.1.3.2-1



SIN Speech Transmit

Figure 1.1.3.2-1

TEST 1.1.3.4

1. Title

TCSS Transmit to LF and LF Signaling Output.

2. Objectives

2.1 To verify that frequency response and bandwidth of TCSS transmit function conform to specifications.

2.2 To verify that the LF Signaling output operates properly.

3. Description

3.1 Connect equipment per Figure 1.1.3.4-1.

3.2 Remove cables from J7, J8 and J10. Leave these cables disconnected during this test.

3.3 Turn rack power ON.

3.4 Connect 600 ± 30 ohm resistor and a VTVM to output points defined by Table 1.1.3.4-1, Test 1.

3.5 Connect an audio oscillator with an internal impedance of 600 ± 30 ohms, a VTVM and a frequency counter to input point defined by Table 1.1.3.4-1, Test 1.

3.6 Perform Test 1 outlined in Table 1.1.3.4-1, Test 1 and make note of observations. Repeat for Tests 2 through 10.

3.7 Remove Audio Oscillator, VTVM and Frequency Counter from input points and connect equipment as per Figure 1.1.3.4-2, Test 11.

3.8 Connect 600 ± 300 to input point defined in Table 1.1.3.4-2, Test 11.

3.9 Connect Frequency Counter and Oscilloscope to 600 ± 30 ohm resistor and VTVM at output point defined in Table 1.1.3.4-2, Test 12.

3.10 Connect 24 VDC source to "M" lead input defined in Table 1.1.3.4-2, Test 11.

3.11 Perform tests outlined in Table 1.1.3.4-2, Test 12 and note 2600 cps sinusoidal output at a level of 0 dbm (0.778 volts/600 ohms) plus or minus 1.5 db at output points. Repeat for Tests 12 thru 20.

4. Equipment in Test

Telephone Connecting and Switching Set AN/GTC-8

5. Test Equipment

5.1 VTVM, Hewlett-Packard 400C

5.2 Oscilloscope, Tektronix 545 or equivalent

5.3 Frequency Counter, Berkeley or equivalent

5.4 Audio Oscillator, Hewlett-Packard 200CD

5.5 DC Power Supply, Kepco or equivalent

6. Data Requirements

6.1 Record observations of 3.6 and 3.11 on M&IR Log.

6.2 Record any discrepancies or unexpected occurrences in M&IR Log.

Input Conditions				Monitor Conditions		
Test Number	Input Point	Input Freq.	Input Level	Output Point	Output Level	Remarks
1	J10-33,-32	1000	3 dbm	J8-2,-3	13 ± 1 dbm	Reference level is the output level at 1000 cps.
		300 to 2200			± 3 dbm of Reference	13 dbm is 3.45 volts/600 ohms
		2500			± 6 dbm of Reference	3 dbm is 1.1 volts/600 ohms
		2600			At least 55 dbm below reference.	
		2900 to 3400			At least 55 dbm below reference.	
	J10-33,-32			J8-2,-3		
2	J10-31,-30	As in Test 1	3 dbm	J8-4,-5	As in Test 1	
3	J10-29,-28			J8-6,-7		
4	J10-27,-26			J8-8,-9		
5	J10-25,-24			J8-10,-11		
6	J10-23,-22			J8-12,-13		
7	J10-21,-20			J8-14,-15		
8	J10-19,-18			J8-16,-17		
9	J10-17,-16			J8-18,-19		
10	J10-15,-14	As in Test 1	3 dbm	J8-20,-21	As in Test 1	

Table 1.1.3.4-1

	Input Conditions				Monitor Conditions			
Test No.	Input Point	"M" Lead Input		"M" Lead Input Level	Output Point	Output Level	Output Frequency cps	Remarks
		Neg.	Pos.					
11	J10-33,-32	J7-46	J7-67	24 VDC	J8-2,-3	0 ± 1.5 dbm	2600	0 dbm is 0.778 volts/ 600 ohms
12	J10-31,-30	J7-43	J7-67		J8-4,-5			
13	J10-29,-28	J7-40	J7-67		J8-6,-7			
14	J10-27,-26	J7-37	J7-67		J8-8,-9			
15	J10-25,-24	J7-34	J7-67		J8-10,-11			
16	J10-23,-22	J7-31	J7-67		J8-12,-13			
17	J10-21,-20	J7-28	J7-67		J8-14,-15			
18	J10-19,-18	J7-25	J7-67		J8-16,-17			
19	J10-17,-16	J7-22	J7-67		J8-18,-19			
20	J10-15,-14	J7-19	J7-67	24 VDC	J8-20,-21	0 ± 1.5 dbm	2600	

Table 1.1.3.4-2

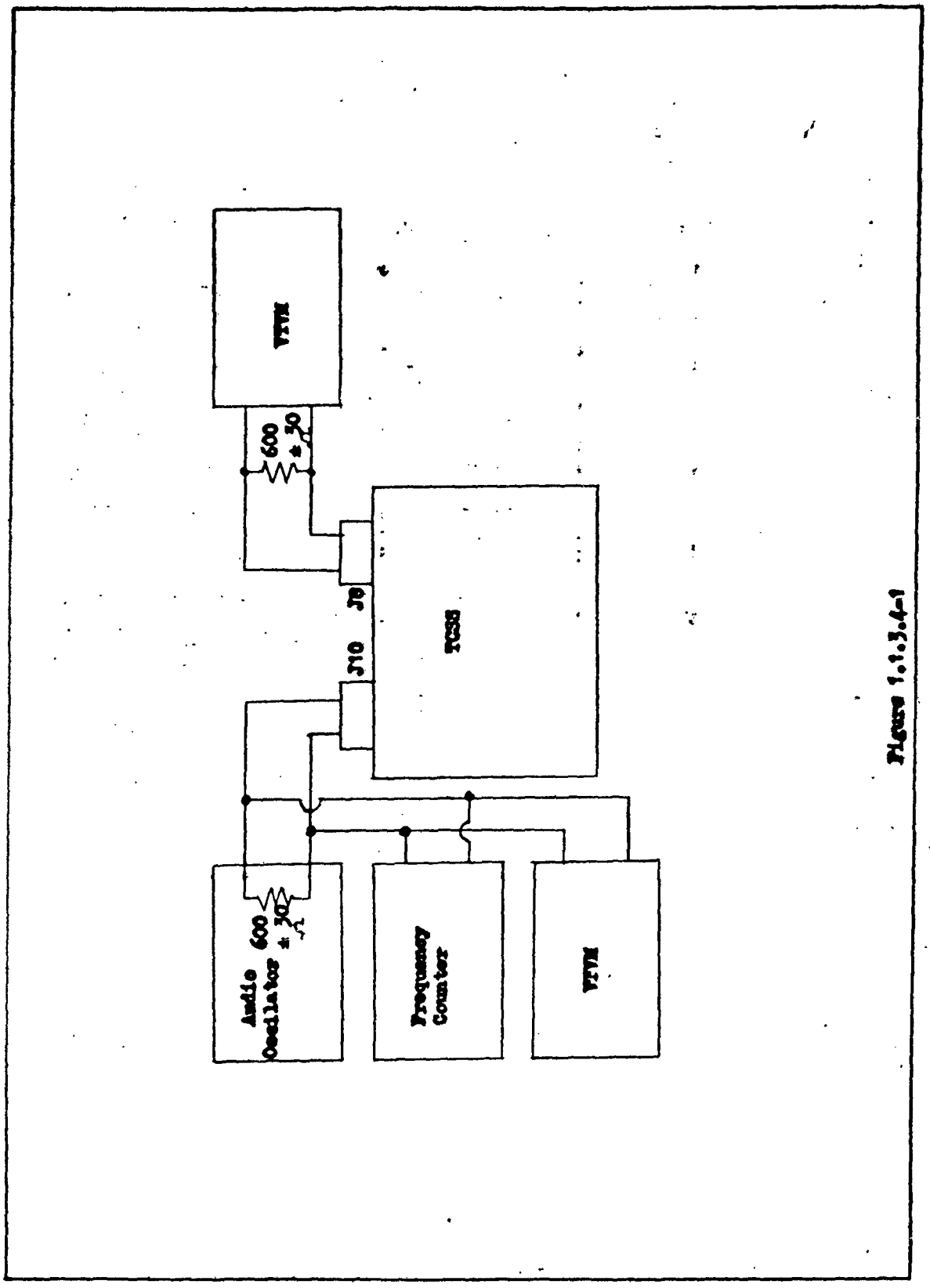


Figure 1.1.3.4-1

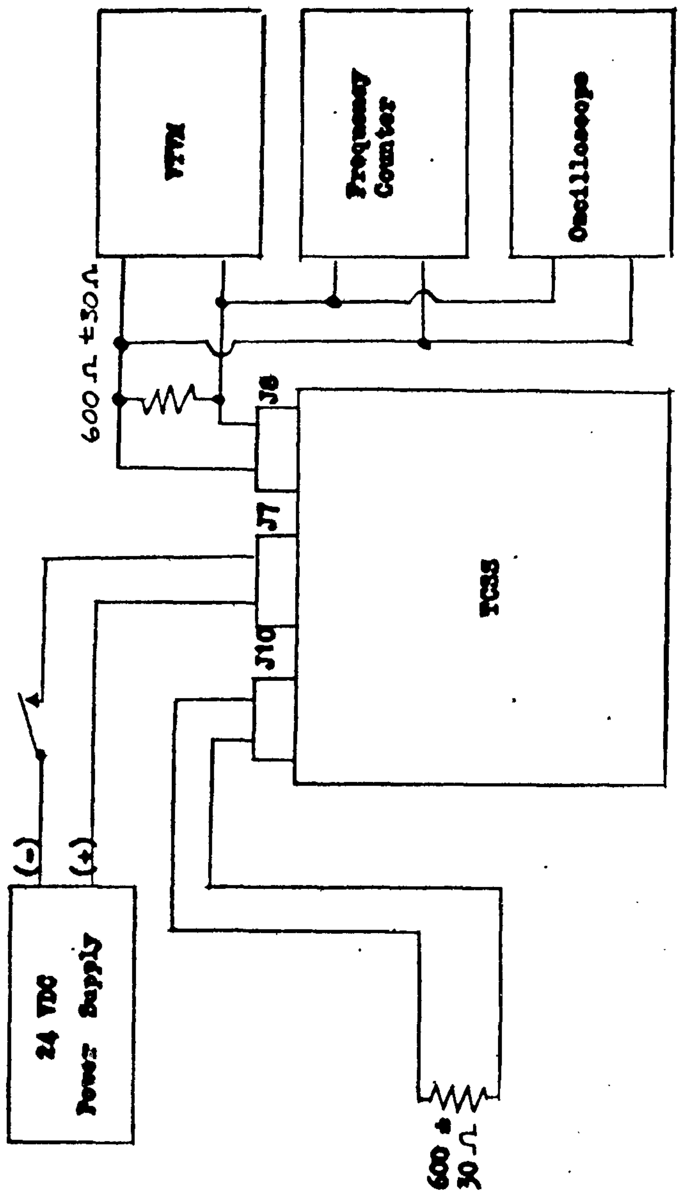


Figure 1.1.3.4-2

TEST 1.1.3.5

1. Title

TCSS Receive from LF, Lamp Cut-Off and LF Lamp Circuits and LF Signaling Input.

2. Objectives

2.1 To verify that the frequency response and bandwidth of the TCSS receive function conform to specifications.

2.2 To verify that operation of lamp cut-off and LF lamp circuits are as specified.

3. Description

3.1 Connect equipment as shown in Figure 1.1.3.5-1.

3.2 Remove Cables W014 from ESA J-Box Simulator, (J9); W069 from TCSS (J9), W070 from TCSS (J8). Do not reconnect these cables until test is completed.

3.3 Turn rack power ON.

3.4 Connect an Audio Oscillator with a 600 ± 30 ohm internal impedance, a Frequency Counter and a VTVM to input point defined in Table 1.1.3.5-1, Test 1.

3.5 Connect 600 ± 30 ohm resistor, an oscilloscope and a VTVM to output point defined in Table 1.1.3.5-1, Test 1.

3.6 Perform Test 1 outlined in Table 1.1.3.5-1, Test 1 and note observations.

3.7 Repeat procedures 3.3, 3.4, and 3.5 for Tests 2 thru 10.

3.8 Connect equipment as in Figure 1.1.3.5-2.

3.9 Connect an Audio Oscillator with an internal impedance of 600 ± 30 ohms, a VTVM, a Frequency Counter, and an oscilloscope to input point specified in Table 1.1.3.5-2, Test 11.

3.10 Connect 24 VDC to LCO lead as specified in Table 1.1.3.5-2, Test 11.

3.11 Connect DC Voltmeter and Frequency meter to LF Lamp output defined in Table 1.1.3.5-2, Test 11.

3.12 Connect DC Voltmeter to Alarm output defined in Table 1.1.3.5-2, Test 11.

3.13 Perform Test 11 outlined in Table 1.1.3.5-2 and note observations.

3.14 Repeat Procedures 3.7, 3.8, 3.9, 3.10 and 3.11 for Tests 12 thru 20.

4. Equipment in Test

Telephone Connecting and Switching Set AN/GTC-8

5. Test Equipment

5.1 VTVM, Hewlett-Packard 400C.

5.2 Oscilloscope, Tektronix 545.

5.3 Frequency Counter, Berkeley Eput Meter or equivalent.

5.4 Audio Oscillator, Hewlett-Packard 200CD.

5.5 24 VDC Supply, Kepco or equivalent.

5.6 DC Voltmeter, Triplett 630A.

6. Data Requirements

Record observations on M&IR Log.

Input Conditions				Monitor Points		
Test Number	Input Points	Input Frequency cps	Input Level	Output Points	Output Level	Remarks
1	J8-23,-24	1000	Minus 7 dbm	J9-32,-33	- 13 dbm ± 1 db	Reference level is the output level at 1000 cps.
		300 to 2200			± 3 db of Reference	
		2500			± 6 db of Reference	Minus 7 dbm is 0.35 volts/600 ohms
		2600			Not greater than -56 db of Reference	Minus 13 dbm is 0.175/ 600 ohms
	J8-23,-24	2900 to 3400	Minus 7 dbm	J9-32,-33	Not greater than -56 db of Reference	
2	J8-25,-26	As in Test 1	As in Test 1	J9-30,-31	As in Test 1	
3	J8-27,-28			J9-28,-29		
4	J8-29,-30			J9-26,-27		
5	J8-31,-32			J9-24,-25		
6	J8-33,-34			J9-22,-25		
7	J8-35,-36			J9-20,-21		
8	J8-37,-38			J9-18,-19		
9	J8-39,-40			J9-16,-17		
10	J8-41,-42	As in Test 1	As in Test 1	J9-14,-15	As in Test 1	

Table 1.1.3.5-1

Test Number	Input (2600 cps) Input ** Point	Input (2600 cps) Level	LCO Lead Input: Input Point *** Neg.	LCO Lead Input: Input Point *** Pos.	LCO Lead Input: Level	LF Lamp Output: Monitor Point ***	LF Lamp Output: Monitor Point ***	LF Lamp Output: Level	Alarm Output: Monitor Point ** Neg.	Alarm Output: Monitor Point ** Pos.	Alarm Output: Level	Remarks
11.a	J8-23,-24	-20 dbm	J25-44	J25-67	0 VDC	J25-45	J25-67	24 VDC*	J25-15	J25-67	24 VDC	*Lamp output is interrupted at 60 ± 20 cpm.
b	J8-23,-24	0 volt	J25-44		24 VDC	J25-45		24 VDC*			24 VDC	J7-67 and J4-2 are ground.
c	J8-23,-24	-20 dbm	J25-44		24 VDC	J25-45		24 VDC			0 VDC	
12	J8-25,-26	As in Test 1	J25-41		As in Test 1	J25-42		As in Test 1			As in Test 1	Minus 20 dbm is .078 volts/600 ohms
13	J8-27,-28		J25-38			J25-39						** Input point on TCSS Rack. Corresponding output terminals at J9 as outlined in tests 1 through 10 shall be loaded with 600 ± 30 Ω .
14	J8-29,-30		J25-35			J25-36						
15	J8-31,-32		J25-32			J25-33						
16	J8-33,-34		J25-29			J25-30						
17	J8-35,-36		J25-26			J25-27						*** Points designated at J25 shall be monitored at the ESA J-Box Simulator.
18	J8-37,-38		J25-23			J25-24						
19	J8-39,-40		J25-20			J25-21						
20	J8-41,-42	As in Test 1	J25-17	J25-67	As in Test 1	J25-18	J25-67	As in Test 1	J25-15	J25-67	As in Test 1	

Table 1.1.3.5-2

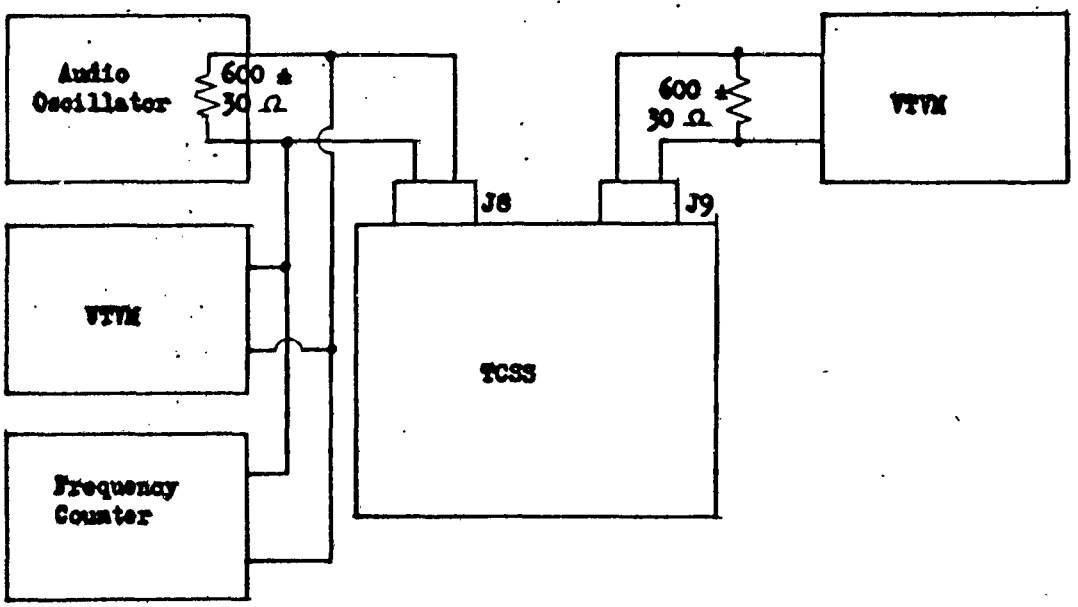


Figure 1.1.3.5-1

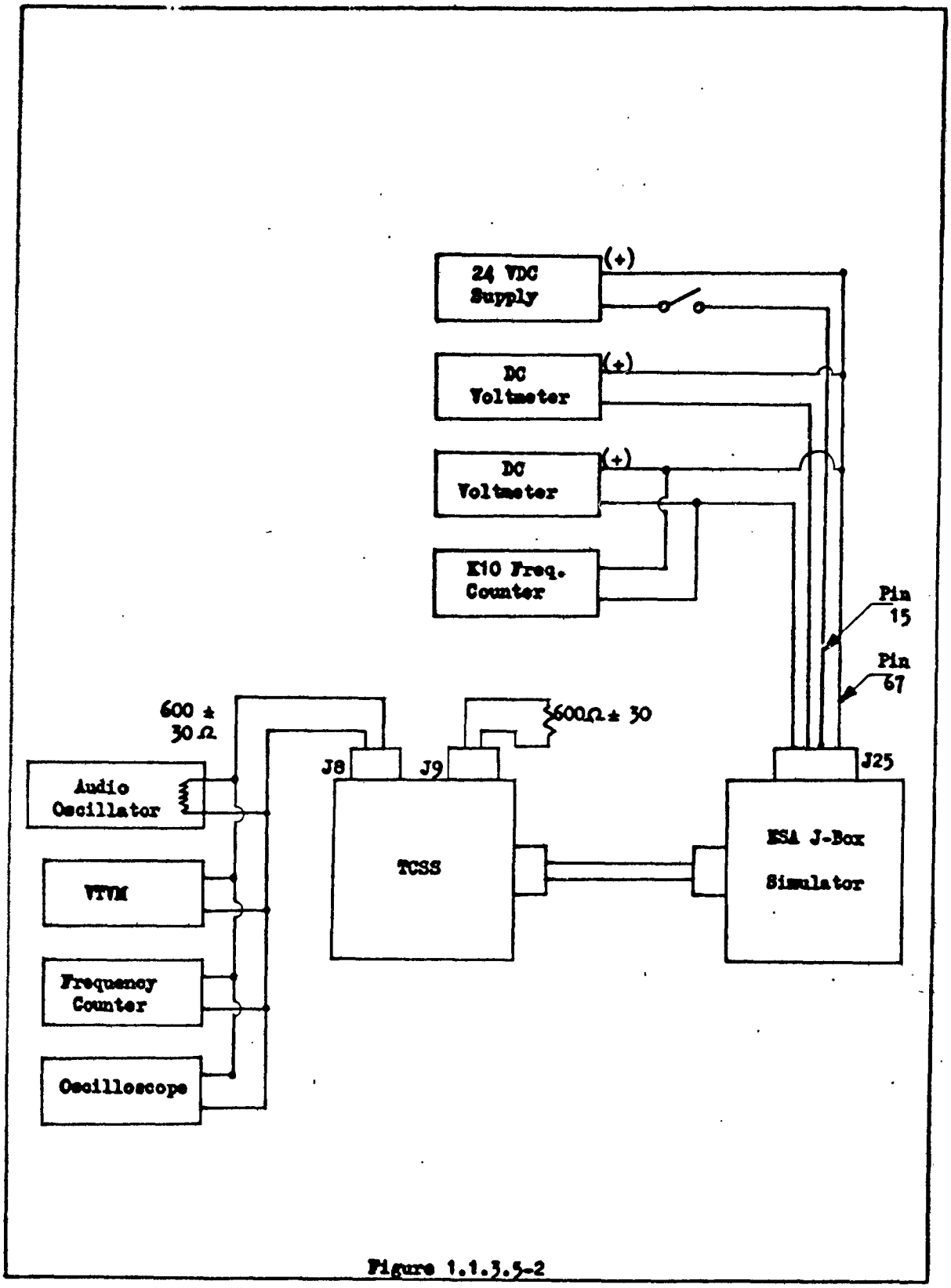


Figure 1.1.3.5-2

TEST 1.1.3.6

1. Title

   TCSS VHF Radio Circuits.

2. Objectives

   2.1 To verify that the "Transmit from CP-VHF" and "Receive at CP-VHF" functions conforms to specifications.

   2.2 To verify that an audio signal (voice) will operate the voice-operated signaling detector.

   2.3 To verify that the keying circuit conforms to specifications.

3. Description

   3.1 Connect the equipment as shown in Figure 1.1.3.6-1.

   3.2 Disconnect cables W069 and W092 from J9 and J10 of the TCSS.

   3.3 Turn rack power on.

   3.4 Apply a 1000 cps, 0 dbm (0.778 volt/600Ω) sinusoidal input at J2-4,5.

   3.5 Note that the corresponding output at J9-36,37 should be at a level of + 3 dbm (1.1 volts/600Ω) ± 3 db.

   3.6 Vary the input frequency from 300 to 3000 cps.

   3.7 Note that the output level shall not vary more than 3 db from the 1000 cps reference.

   3.8 The oscilloscope should indicate a harmonic distortion of less than 10%.

   3.9 Connect the equipment as shown in Figure 1.1.3.6-2.

   3.10 Disconnect cable W014, from the ESA J-Box Simulator. Short-circuit J7-65,-66.

   3.11 Apply a 1000 cps, + 3 dbm sinusoidal input at J10-36,37.

   3.12 Note that the corresponding output at J2-4,5 should be at a level of + 3 dbm plus 0.25 to minus 3.25 db.

3.13 Repeat steps 3.6,3.7 and 3.8.

3.14 Connect equipment as shown in Figure 1.1.3.6-3.

3.15 Connect all cables to TCSS except to J2.

3.16 Adjust attenuator until the voice input to J2-45 is a maximum of -3 dbm (.55 volt/600 Ω)

3.17 Note that on J7-15,67 and J7-64,67, an interrupted 24 VDC at 60 ± 20 cpm is indicated by the DC voltmeters.

3.18 Apply 24 VDC to J7-63 and J7-67 (positive).

3.19 Note that this will produce a constant 24 VDC on J7-15, -67 and J7-64, -67.

3.20 Test the keying circuit by short-circuiting J7-65,-66.

Note that a short circuit exists at J2-6,-7.

4. Equipment in Test

Telephone connecting and switching set AN/GTC-8

5. Test Equipment

5.1 Audio Oscillator HP model 200 CD

5.2 Frequency counter Berkeley 554B

5.3 VTVM HP model 400C

5.4 Oscilloscope Teltronic model 545

5.5 Attenuator General Radio Model 1450-TA

5.6 DC Voltmeter Triplett 630A

5.7 Message Simulator, CTE Rack

6. Data Requirements

Record all observations on M&IR Test Log.

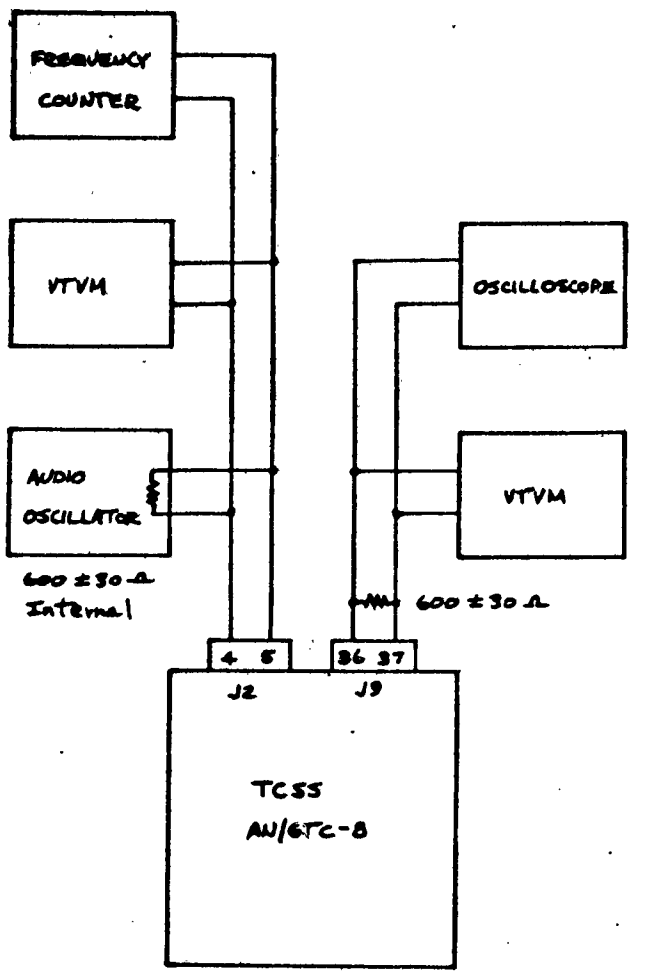
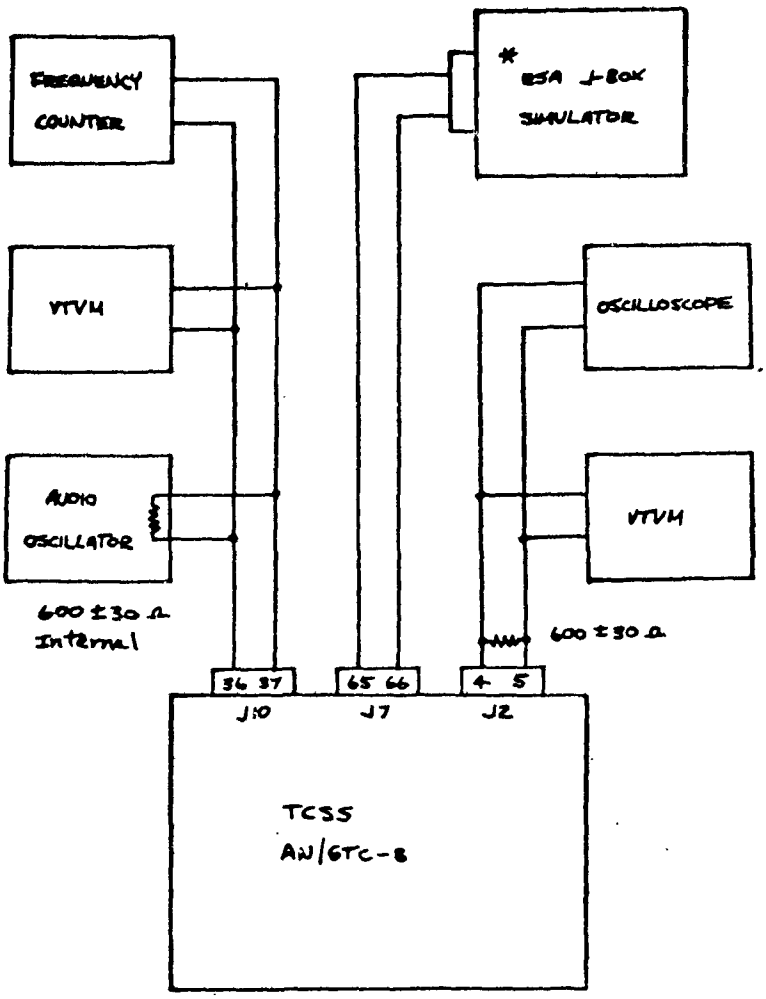


FIGURE 1.1.3.6-1



* REMOVE CABLE W014 SHORT-CIRCUIT PINS 65 & 66 ON THE ESA J-BOX SIMULATOR.

FIGURE 11.3.6 -2

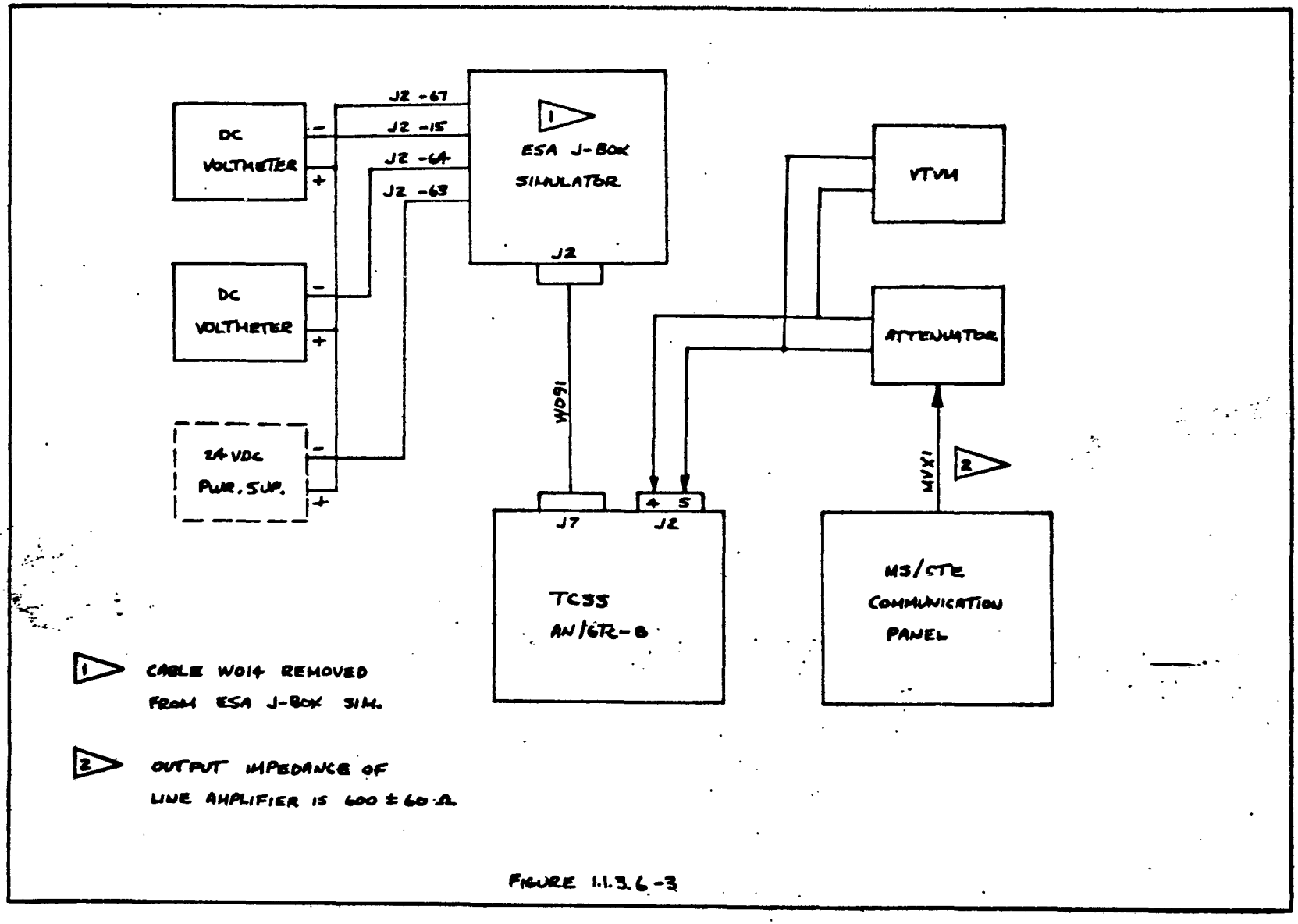


FIGURE 1.1.3.6-3

TEST 1.1.4.1

1. Title

LCF/DAC Power Supply Functional Test

2. Objectives

To determine that DAC power supplies are producing in tolerance DC output voltages, ripple voltage is within specification, and on-off sequencing is correct.

3. Description

3.1 Connect the equipment per Figure 1.1.4.1-1.

3.2 Apply +28 VDC at input to LCF/DAC racks.

3.3 Turn on DAC racks in sequence: 304, 305, and 303.

3.4 (Visual indication) Verify LAMP TEST on Indicator Panels located on 305/A1 and 304/A1 illuminate all indicators.

3.5 Install Drawer MGE Connector breakout box on J2 on front of power supply located at 305/A7.

3.6 Measure DC voltages and ripple voltage at each of the following points, verify that correct signals are obtained.

(Monitor Points)	(Signal)
J2-A to J2-B (Gnd)	+27.5 to +30.0 VDC
J2-C to J2-G (Gnd)	-5.82 to -6.18 VDC
J2-D to J2-G (Gnd)	-5.82 to -6.18 VDC
J2-F to J2-G (Gnd)	-17.46 to -18.54 VDC

(Monitor Points)	(Signal)
J2-E to J2-G (Gnd)	-17.46 to -18.54 VDC
J2-J to J2-G (Gnd)	-8.5 to -9.5 VDC
J2-H to J2-G (Gnd)	+5.82 to +6.18 VDC
J2-K to J2-G (Gnd)	+28 VDC Isolation Converter

Measure voltage, current ripple and noise at the input of the Rack.

Specifications are as follows: Voltage - 28 volts -0.5 to +2.0 V

Current - 22 amps ± 2a.

Ripple and Noise - 3 volts P-P Maximum.

3.7 Turn off power supplies.

3.8 Connect the above test points to tape recorder.

3.9 Turn on power supply for 10 seconds and then turn off; use fast recording speed.

3.10 Perform steps 3.2 through 3.9 for power supply located 305/A7.

4. Equipment in Test

Data Analysis Central - AN/GYK-2

5. Test Equipment Required

5.1 Oscilloscope - Tektronix 545

5.2 Voltmeter - Fluke 801

5.3 Ammeter - 0 to 30 amp range.

5.4 NRA Instrumentation System.

6. Data Requirements

6.1 All measurements are to be recorded in Test Log for NRA-I functional test. Record tapes at 60 ips and play back at 7.5 ips onto the oscillograph.

6.2 Set up magnetic tape recorder per Table 1.1.4.1-1.

Table 4.1.4.1-1

Tape Channel No.	Gain	DC/AC	Signal Monitor Point [1]	Signal Characteristics	Osc. Scale V/In.
1	1.0	DC	Power Supply J2-G	Output Common (0V)	2.0
2	0.25	DC	J2-C	-6V #1	5.0
3	0.25	DC	J2-D	-6V #2	5.0
4	0.167	DC	J2-E	-18V #1	10.0
5	0.167	DC	J2-F	-18V #2	10.0
6	1.0	DC	J2-B	+28V Return (0V)	2.0
7	0.25	DC	J2-H	+6V	5.0
8	0.25	DC	J2-J	-9V	5.0
9	0.167	DC	J2-M	+28V (4 amp)	12.0
10	0.167	DC	J2-N	+28V (2 amp)	12.0
11					
12	1.0	AC	Audio Oscill.	1000 cps 2V p-p reference	2.0
13	1.0	AC	2-44	Time Code 100 cps	1.0
14		[1]	All points referenced to instrumentation ground.	Voice	

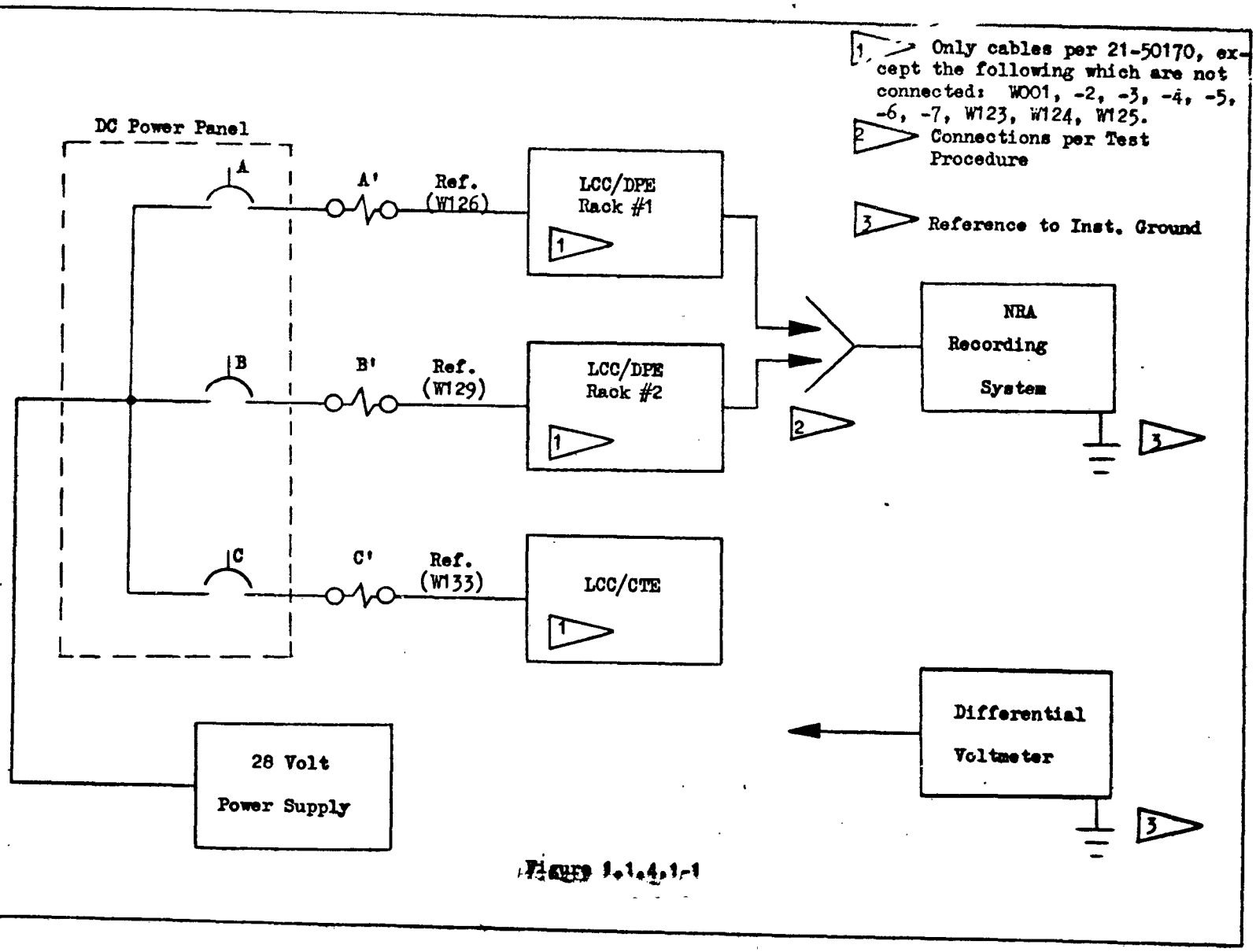


Figure 1.1.4.1-1

TEST 1.1.4.1 SUPPLEMENT

1. Title

   Verification of Individual Rack Lab Power Supply Voltage

2. Objective

   To verify that the correct supply voltages appear at the correct pins in the connectors of the following cables: W707, W704, W145, W057, W133, W139, W120, W127 and W119.

3. Description

   3.1 Disconnect cable W707 from Rack 402 and measure the 28 volt input to the rack. Refer to drawing #21-52060 for the proper pin connection.

   3.2 Verify that the measured voltage is 27.5 to 30.5 volts DC. If the voltage is out-of-tolerance, adjust the Perkins Power Supply to in-tolerance output.

   3.3 Repeat (3.1) and (3.2) for W704, W145, W057, W133, W139, W120, W127 and W119.

4. Equipment in Test

   4.1 Perkins DC Power Supplies 29-19256-1,-2

   4.2 DC Switch Box 25-24959-1

   4.3 NRA Cables 21-50170

5. Test Equipment Required

   DC Voltmeter, Fluke 801

6. Data Requirements

   Record all date in MEIR Test Log.

TEST 1.1.4.2

1. Title

LCF/DAC Command and Status Receive

2. Objective

To verify that command and status receive channels have correct bandwidth, gain, equalization.

3. Description

3.1 Connect the equipment per Figures 1.3.1.1-2 and 1.1.4.2-1.

3.2 Install cable breakout boxes on LCF/DDC J1, J2, J8 and J12; do not reconnect removed cables.

3.3 Connect a 600 ± 30 ohm output impedance audio oscillator to the J1 and J2 breakout points listed in Table 1.1.4.2-1.

3.4 Connect a 600 ± 30 ohm resistor across the J8 and J12 output breakout points listed in Table 1.1.4.2-1.

3.5 Assure that the repeat coils are strapped at the #19 AWG, 470/600 ohm impedance ratio (Strap B on TB1 through TB10).

3.6 Assure that the equalizer resistance is 21 ohms, adjustment for 16 to 23 miles of line (Straps A, B, D, F, H on TB11 thru TB20).

3.7 Connect frequency counter and VTVM across the audio oscillator and a VTVM across the 600 ohm resistance.

3.8 Supply the input conditions listed in Table 1.1.4.2-1 and verify that the corresponding outputs are obtained.

4. Equipment in Test

4.1 LCF/Data Analysis Central AN/GYK-1

4.2 Cable Breakout Boxes

5. Test Equipment Required

Electronic Counter - Berkeley

True RMS Voltmeter - Ballentine 320A

Audio Oscillator - Hewlett-Packard 200CD

6. Data Requirements

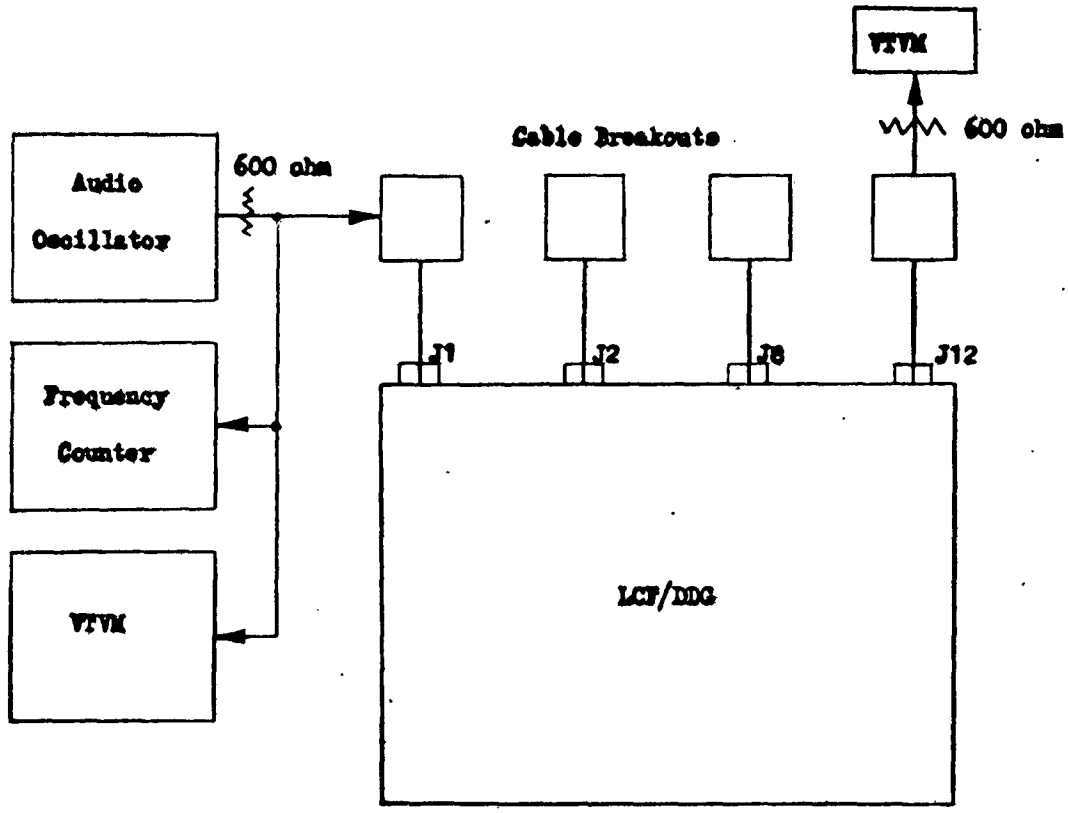
Record all data in the Test Log.

Table 1.1.4.2-1

Test Conditions				Monitor Points		
Test Number	Input Points	Input Frequency cps	Input Level MV	Output Points	Output Level	Remarks
1	J1-2,-3	1000	10	J8-2,-3	3±1 dbm	Adjust gain to obtain 3 ± 1 dbm with 10 MV input. Reference output is the output adjusted to 1000 cps.
		200	11 to 19		Reference	
		300	10 to 18			
		500	9 to 17			
		700	8 to 15			
		1400	6 to 11			
		2100	5 to 10			
	J1-2,-3	3100	4 to 10	J8-2,-3	Reference	
2	J1-4,-5	As in Test 1	As in Test 1	J8-4,-5	As in Test 1	
3	J1-6,-7			J8-6,-7		
4	J1-8,-9			J8-8,-9		
5	J1-10,-11			J8-10,-11		
6	J2-2,-3			J8-12,-13		
7	J2-4,-5			J8-14,-15		
8	J2-6,-7			J8-16,-17		
9	J2-8,-9			J8-18,-19		
10	J1-10,-11	As in Test 1	As in Test 1	J8-20,-21	As in Test 1	

Table 1.1.4.2-1 (Continued)

Test Conditions				Monitor Points		
Test Number	Input Points	Input Frequency cps.	Input Level MV..	Output Points	Output Level	Remarks
11	J1-12,-13	As in Test 1	As in Test 1	J12-2,-3	As in Test 1	
12	J1-14,-15			J12-4,-5		
13	J1-16,-17			J12-6,-7		
14	J1-18,-19			J12-8,-9		
15	J1-20,-21			J12-10,-11		
16	J2-12,-13			J12-12,-13		
17	J2-14,-15			J12-14,-15		
18	J2-16,-17			J12-16,-17		
19	J2-18,-19			J12-18,-19		
20	J2-20,-21	As in Test 1	As in Test 1	J12-20,-21	As in Test 1	



Configuration for Command and Status Receive Channel Test.

Figure 1.1.4.2-1

TEST 1.1.4.3

1. Title

LCF/DAC Command Transmit

2. Objective

To verify that attenuation and bandpass of the Command Transmit channels are correct.

3. Description

3.1 Connect the equipment per Figures 1.3.1.1-1, and 1.1.4.3-1.

3.2 Install Cable Breakout boxes on LCF/DDG J3, J13, and J7; do not connect removed cables.

3.3 Connect 600 ± 30 ohm output impedance audio oscillator to the input, J3 breakout points listed in Table 1.1.4.3-1.

3.4 Connect a 470 ± 24 ohm resistor across the output, J13, and J7 breakout points as listed in Table 1.1.4.3-1.

3.5 Connect a voltmeter across the input and output and frequency meter across input. The dbm across the 470 ohm resistance can be obtained by adding 1.03 dbm to the dbm reading indicated on the meter.

3.6 Perform the operations noted in Table 1.1.4.3-1 and verify that the listed results are obtained.

4. Equipment in Test

4.1 LCF/Data Analysis Central AN/GYK-1

5. Test Equipment Required

Electronic Counter - Berkeley

True RMS Voltmeter - Ballentine 320A

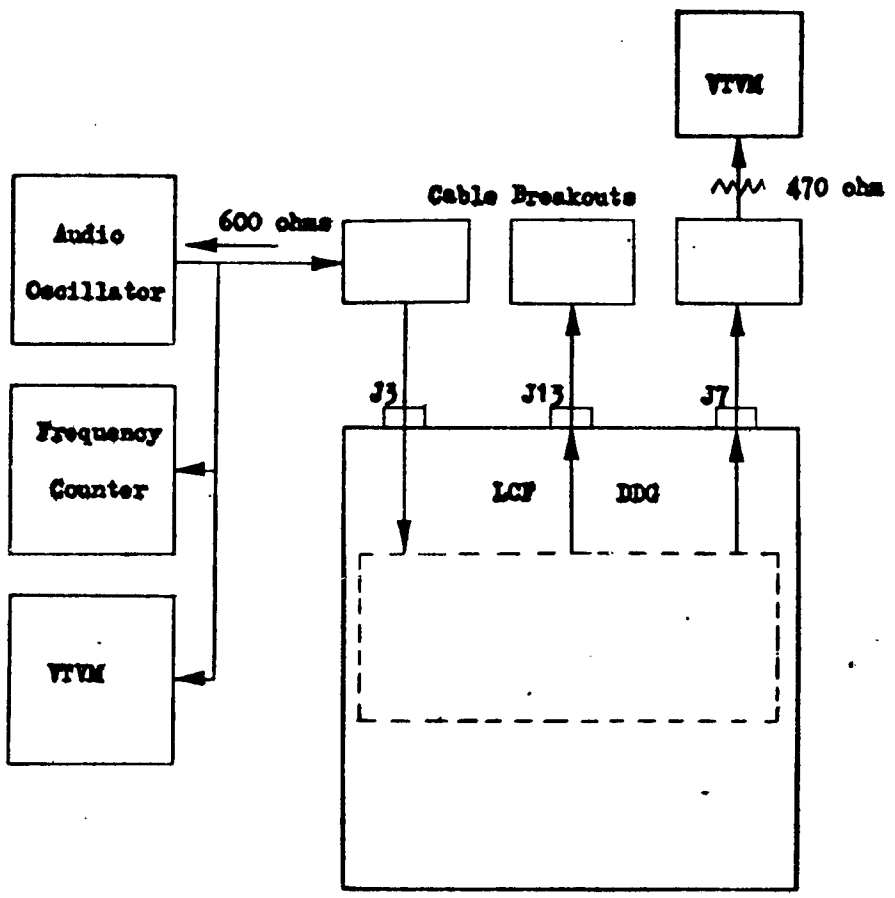
Audio Oscillator - Hewlett-Packard 200CD

6. Data Requirements

Record all data in Test Log for test steps in Table 4.1.4.3-1.

TABLE 7.7.4.3-1

Test Conditions				Monitor Points		
Test Number	Input Points	Input Frequency cps.	Input Level	Output Points	Output Level	Remarks
1	J3-2,-3	1000 200 500 2100	3 to 6 dbm 4 dbm ↕	J13-2,-3	2 to 6 dbm 4dbm - 1dbm ↕	Establish a 4 dbm reference at 1000 cps and assure that attenuation is less than 1 dbm.
	J3-2,03	3100	4 dbm	J13-2,-3	4dbm - 1dbm	
2	J3-4,-5	As in Test 1	As in Test 1	J13-4,-5	As in Test 1	
3	J3-6,-7	↕	↕	J13-6,-7	↕	
4	J3-8,-9			J13-8,-9		
5	J3-10,-11			J13-10,-11		
6	J3-12,-13			J7-2,-3		
7	J3-14,-15			J7-4,-5		
8	J3-16,-17			J7-6,-7		
9	J3-18,-19			J7-8,-9		
10	J3-20,-21	As in Test 1	As in Test 1	J7-10,-11	As in Test 1	



Configuration for Command Transmit Channel Response Tests

Figure 1.1.4.3-1

TEST 1.1.4.5

1. Title

   LCF/DAC Line Failure Detection

2. Objective

   To verify absence of 1300 cps signal on any line produces a line failure indication.

3. Description

   3.1 Connect the equipment per Figures 1.3.1.1-1 and 1.1.4.5-1.

   3.2 Connect patchboard outputs MX_1 through MX_{10} from Message Simulator to ten 23-mile #19AWG Cable Simulators.

   3.3 Connect outputs of Cable Simulators to patchboard inputs C_2R_1 through C_2R_{10}.

   3.4 Program the Message Simulator to produce an all "0's" message on all lines.

   3.5 Perform the test steps on Table 1.1.4.5-1 and observe listed indications.

4. Equipment in Test

   4.1 Data Analysis Central -- AN/GYK-2

   4.2 Message Simulator, DD. 25-29584-1

   4.3 Launch Control Console. 25-24172-11

   4.4 Patch Panel and Cable Simulators. 25-29327-2

5. Test Equipment Required

   Oscilloscope - Tektronix 545

6. Data Requirements

   Record all data and observations in the Test Log.

Input Conditions			Visual Indications on CMPG Indicator Panel and Test Monitor Points			
Test Step No.	Line Tested	Input Line Conditions	Command Input #1	Command Input #2	Biphase Output C2X1	Loss of Marks Indicator All Lines
1	Pri.	C_2R_1 - Out	ON		All "1's"	ON
2	A	C_2R_1 - In	OFF			
3	Sec.	C_2R_1 - Out	ON			
4	A	C_2R_1 - In	OFF			
5	Tert.	C_2R_3 - Out	ON			
6	AB	C_2R_3 - In	OFF			
7	Sec.	C_2R_4 - Out	ON			
8	B	C_2R_4 - In	OFF			
9	Pri.	C_2R_5 - Out	ON			
10	B	C_2R_5 - In	OFF			
11	Pri.	C_2R_6 - Out		ON		
12	C	C_2R_6 - In		OFF		
13	Sec.	C_2R_7 - Out		ON		
14	C	C_2R_7 - In		OFF		
15	Tert.	C_2R_8 - Out		ON		
16	CD	C_2R_8 - In		OFF		
17	Sec.	C_2R_9 - Out		ON		
18	D	C_2R_9 - In		OFF		
19	Pri.	C_2R_{10} - Out		ON		
20	D	C_2R_{10} - In		OFF	All "1's"	ON

Table 1.1.4.5-1

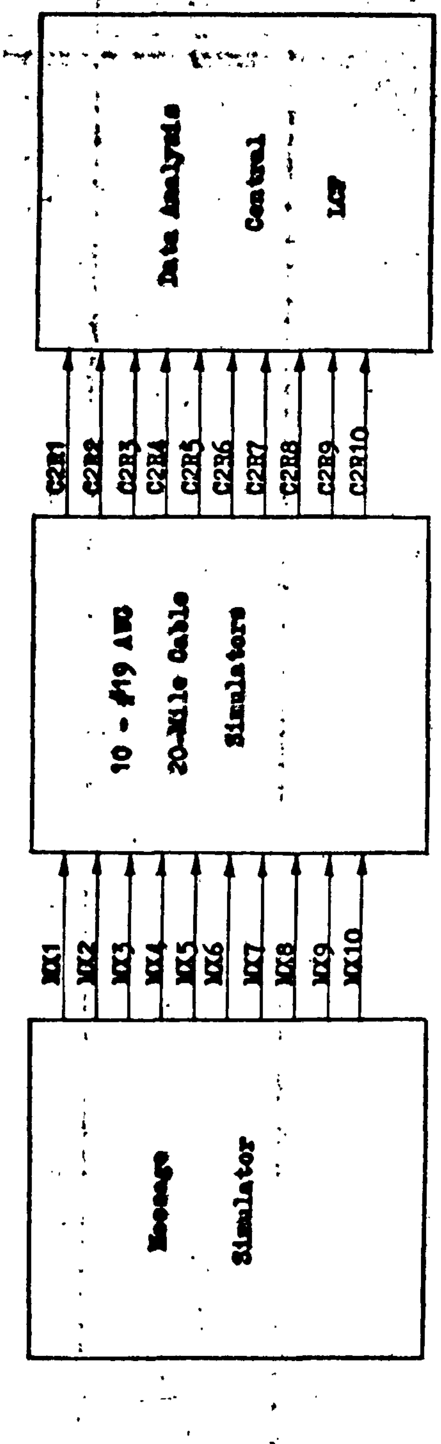


Figure 1.1.4.5-1

TEST 1.1.4.6

1. Title

   LCF/DAC Marks Detection and Line Reset

2. Objectives

   To determine that marks detection circuits function.

   To verify line stepping and reset function.

   To verify Command Line Marks Lost indicators function.

3. Description

   3.1 Connect the equipment per Figures 1.3.1.1-1 and 1.1.4.5-1.

   3.2 Connect transmitter outputs MX_1 through MX_{10} from Message Simulator to ten 23-mile #19 AWG Cable Simulators.

   3.3 Program the Message Simulator to transmit a "1" every 56 bit message.

   3.4 Connect outputs of Cable Simulators to C_2R_1, C_2R_5, C_2R_6, C_2R_{10} switchboard inputs.

   3.5 Depress LINE RESET.

   3.6 Connect oscilloscope to C_2X_1 and verify that "1's" are transmitted continuously throughout test.

   3.7 (Visual Indication) Verify that Primary A, B, C, and D COMMAND LINE MARKS LOST, and Receiver Inoperative indicators are not illuminated while every other indicator is illuminated.

   3.8 (Test Monitor Points) Connect J1-p and q on CMPG drawer A6 and A5 to J2-G on CMPG drawer A7. A reading of -6 volts should be obtained.

   3.9 Program the Message Generator to transmit an all "0's" message.

   3.10 (Visual Indication) Verify that all indicators on CMPG indicator panel are illuminated.

   3.11 (Test Monitor Points) Determine voltages in step 3.8 have changed to 0 VDC.

3.12 Program Message Simulator to transmit a "1" every 56 bits.

3.13 Depress LINE RESET.

3.14 (Visual Indication and Test Monitor Point) Conditions of steps 3.6 and 3.7 should prevail.

4. Equipment in Test

Data Analysis Central - AN/GYK-2

Message Simulator, BD - 25-29584-1

Cable Simulator - 25-29327-2

5. Test Equipment Required

Oscilloscope - Tektronix 545

Voltmeter - Fluke 801

NRA Recording System - 25-33092-8

6. Data Requirements

Record all data and observations in the Test Log.

TEST 1.1.4.7

1. Title

LCF/DAC Line Priority Selection

2. Objectives

2.1 To verify that loss of marks will cause line stepping.

2.2 To verify that 5 zeros is not recognized as sync.

2.3 To verify Command Line Marks Lost and Receiver Inoperative indicators function.

3. Description

3.1 Connect the equipment per Figures 1.1.3.1-1 and 1.1.4.5-1.

3.2 Connect the Message Simulator patchboard outputs MX_1 through MX_{10} to 23-mile Cable Simulators.

3.3 Connect Cable Simulator outputs to patchboard inputs C_2R_1 through C_2R_{10}.

3.4 Program the Message Simulator to transmit an alternating 5 "0's" and 5 "1's" message on all lines.

3.5 Perform the operations indicated on Table 1.1.4.7-1 and observe the noted indications.

4. Equipment in Test

4.1 Data Analysis Central -- AN/GYK-2.

4.2 Message Simulator, DD - 25-29584-1.

4.3 Patch Panel - 25-29327-2

4.4 Cable Simulator - 8318157-501

5. Test Equipment Required

5.1 Oscilloscope - Tektronix 545 with camera

5.2 Voltmeter - Fluke 801

6. Data Requirements

Record all data and observations in the Test Log.

Input Conditions				Visual Indications on CMPG Indicator Panel and Test Monitor Points																
														Receiver Inoperative		Sync Output				Diphase
Test Step Number	Line Tested	Input Line	Condition	Pri. A	Sec. A	Tert. A B	Sec. B	Pri. B	Pri. C	Sec. C	Tert. C D	Sec. D	Pri. D	Ind.	TP ▷2	A ▷3	B ▷4	C ▷5	D ▷6	▷7
1			▷1												-6V	-6V	-6V	-6V	-6V	All "1's"
2	Pri.	C_2R_1	- Out	ON											-6V	↑	↑	↑	↑	↑
3	A	C_2R_1	- In	ON											-6V					
4	Sec.	C_2R_2	- Out	ON	ON										-6V					
5	A	C_2R_2	- In	ON	ON										-6V					
6	Tert.	C_2R_3	- Out	ON	ON	ON								ON	0V					
7	AB	C_2R_3	- In	ON	ON										-6V					
8			▷1																	
9	Pri.	C_2R_5	- Out					ON							-6V					
10	B	C_2R_5	- In					ON							-6V					
11	Sec.	C_2R_4	- Out				ON	ON							-6V					
12	B	C_2R_4	- In				ON	ON							-6V					
13	Tert.	C_2R_3	- Out			ON	ON	ON						ON	0V					
14	AB	C_2R_3	- In				ON	ON							-6V					
15			▷1												-6V					
16	Pri.	C_2R_6	- Out						ON						-6V					
17	C	C_2R_6	- In						ON						-6V					
18	Sec.	C_2R_7	- Out						ON	ON					-6V	↓	↓	↓	↓	↓
19	C	C_2R_7	- In						ON	ON					-6V	-6V	-6V	-6V	-6V	All "1's"

TABLE 1.[illegible].4.7-1

Input Conditions			Visual Indications on CMPG Indicator Panel and Test Monitor Points																
Test Step Number	Line Tested	Input Line Condition	Pri. A	Sec. A	Tert. A B	Sec. B	Pri. B	Pri. C	Sec. C	Tert. C D	Sec. D	Pri. D	Receiver Inoperative Ind.	Receiver Inoperative TP (2)	Sync Output A (5)	Sync Output B (5)	Sync Output C (5)	Sync Output D (5)	Diphase (7)
20	Tert.	C_2R_8 - Out						ON	ON	ON			ON	0V	-6V	-6V	-6V	-6V	All "1's"
21	CD	C_2R_8 - In						ON	ON					-6V					
22		(1)												-6V					
23	Pri.	C_2R_{10} - Out										ON		-6V					
24	D	C_2R_{10} - In										ON		-6V					
25	Sec.	C_2R_9 - Out									ON	ON		-6V					
26	D	C_2R_9 - In									ON	ON		-6V					
27	Tert.	C_2R_8 - Out								ON	ON	ON	ON	0 V					
28	CD	C_2R_8 - In									ON	ON		-6V	-6V	-6V	-6V	-6V	All "1's"

(1) LINE RESET depressed

(2) J1-A CMPG/A4 to J1-G CMPG/A7

(3) J1-B CMPG/A4 to J1-G CMPG/A7

(4) J1-C CMPG/A4 to J1-G CMPG/A7

(5) J1-D CMPG/A4 to J1-G CMPG/A7

(6) J1-E CMPG/A4 to J1-G CMPG/A7

(7) Connect C_2X_1 to oscilloscope

Table 1.1.4.7-1 (Continued)

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TEST 1.1.4.8

1. Title

   LOF/DAC Line Selection and Sync Detection

2. Objectives

   2.1 To determine the six "0's" will produce a sync pulse.

   2.2 To verify that storing of a sync will initiate a line search and line seizure.

   2.3 To verify the Network Traffic function.

   2.4 To verify message retransmission, frame counting and lockout.

3. Description

   3.1 Connect the equipment per Figures 1.3.1.1-1 and 1.1.4.8-1.

   3.2 Connect Message Simulator patchboard outputs MX_1, MX_5, MX_6, and MX_{10} to 23-mile Cable Simulators.

   3.3 Connect Cable Simulator outputs to patchboard command inputs C_2R_1, C_2R_5, C_2R_6, and C_2R_{10}.

   3.4 Program the Message Simulator to transmit all "1's" on three lines and 6 "0's" and "1" "0" alternating message on one line. (Make bits no. 8 and 10 of the message a mark).

   3.5 Verify that the message with valid sync is retransmitted on the one line.

   3.6 Depress LINE RESET on CMPG Indicator Panel

   3.7 Verify that Primary A, B, C and D and Receiver Inoperative indicators on CMPG Indicator Panel are not illuminated.

   3.8 Perform the operations noted in Table 1.1.4.8-2 by reprogramming the Message Simulator and observe the noted indications.

   3.9 Verify that 18 message lengths of "1's" message pattern is retransmitted on all lines C_2X_1, through C_2X_{10}.

3.10 Verify that Transmit Tone Lost Indicators on CMPC Indicator Panel are not illuminated.

3.11 Verify that grounding of J1-C on CMPC/A2 illuminates all indicators of step 3.10.

4. Equipment in Test

4.1 Data Analysis Central - An/GYK-2

4.2 Message Simulator - 25-29584-1

4.3 Launch Control Console - 25-24172-11

4.4 Cable Simulator - 8318157-501

4.5 Patch Panel - 25-29327-2

5. Test Equipment Required

5.1 Oscilloscope - Tektronix 545

5.2 Voltmeter - Fluke 801

5.3 NRA Instrumentation System - 25-33093-8

6. Data Requirements

Record the signals in Table 1.1.4.8-2 in steps 3.4 and 3.9.

Channel	Gain	DC/AC	Monitor	Signal Characteristics	Oscillograph Playback Volts/ Inch
1	0.5	AC	MX1	Diphase 1300 cps	4.0
2	↓	↓	MX5	↓	↓
3			MX6		
4			MX10		
5			C2X1		
6					
7					
8					
9					
10					
11					
12	1.0	AC	Audio Osc.	2 volt p-p 1300 cps	2.0
13	——	AC	——	Voice Reference	——
14	1.0	AC	2.44	Time Code 100 pps	1.0

Table 1.1.4.8-1

Test Conditions				Visual Indications and Test Monitor Indications								
Test Step Number	Line with Sync Message	Net Traffic		Sync Pulse								Biphase
		Ind.	(1)	A (2)	B (3)	C (4)	D (5)	A (6)	B (7)	C (8)	D (9)	(10)
1	Pri. A	ON	0V	180µs 0V				0V				Message
2	None	OFF	-6V									
3	Pri. B	ON	0V		180µs 0V				0V			Message
4	None	OFF	-6V									
5	Prim. C	ON	0V			180µs 0V				0V		Message
6	None	OFF	-6V									
7	Pri. D	ON	0V				180µs 0V				0V	Message
8	None	OFF	-6V									

When monitoring the following test points, use CMPG/A7 J2-G as ground reference:

(1) J1-E CMPG/A3
(2) J1-B CMPG/A4
(3) J1-C CMPG/A4
(4) J1-D CMPG/A4
(5) J1-E CMPG/A4
(6) J1-P CMPG/A3
(7) J1-R CMPG/A3
(8) J1-S CMPG/A3
(9) J1-T CMPG/A3
(10) $C_2 X_1$ on Patchboard to oscilloscope.

Table 1.1.4.8-2

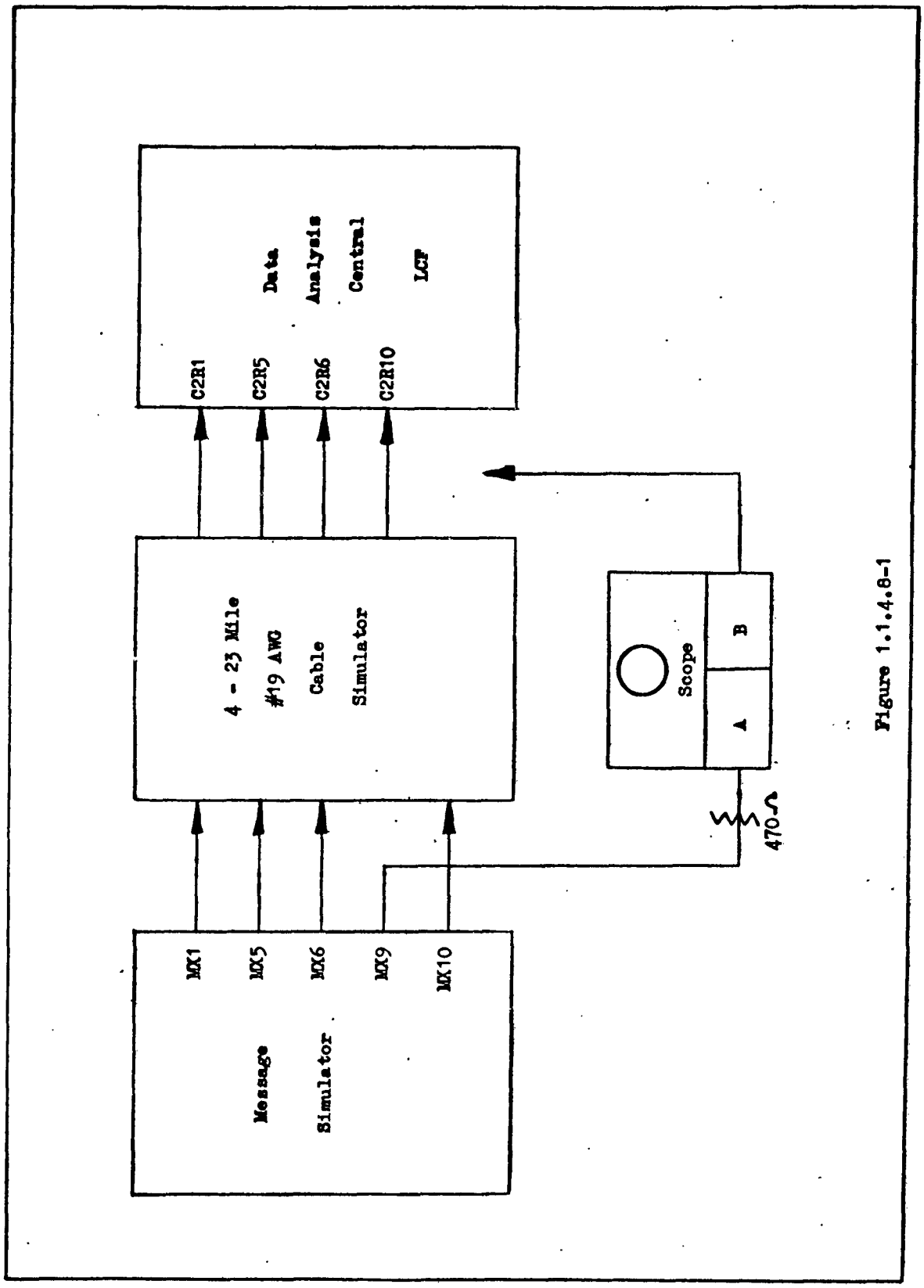


Figure 1.1.4.8-1

TEST 1.1.4.10

1. Title

   LCP/DAC Cycle Detection and Zero Indication

2. Objectives

   To determine that cycle detection circuitry and indicators function.

   To determine that zero indicator circuitry functions.

   To determine that injection alarm circuitry functions.

3. Description

   3.1 Connect the equipment per Figures 1.3.1.1-1 and 1.1.4.5-1.

   3.2 Connect Message Simulator patchboard outputs MX_1 through MX_{10} to 23 mile simulator.

   3.3 Connect Cable Simulator outputs to patchboard inputs C_2R_1 through C_2R_{10}.

   3.4 Program the Message Simulator to transmit a 6 "0's" and "1" - "0" alternating messages on all lines.

   3.5 Depress LINE RESET on CMPG Indicator Panel.

   3.6 Depress ZERO DETECTOR RESET on C & SMPG Indicator Panel.

   3.7 Verify that Zero Indicator and Cycle Detector on C & SMPG Indicator Panel are <u>not</u> illuminated.

   3.8 Ground J1-J on C & SMPG/A2.

   3.9 (Visual Indication and Test Monitor Points)

   (a) Verify that Cycle Detector Indicator is illuminated.

   (b) Verify that J1-A on C & SMPG/A2 is C V.

   (c) Verify that J1-C on C & SMPG/A2 is -6V approximately 57 ms after ground in step 3.8 is applied.

3.10 Remove ground applied in step 3.8.

3.11 (Visual Indication and Test Monitor Points)

(a) Verify that Cycle Detector Indicator is extinguished.

(b) Verify that J1-A on C & SMPG/A2 is -6V.

(c) Verify that J1-C on C & SMPG/A2 is 0 V.

3.12 Remove cable from J5 on top of C & SMPG rack.

3.13 (Visual Indication and Test Monitor Points)

(a) Verify that Zero Indicator is illuminated.

(b) Verify that J1-B on C & SMPG/A2 is 0 V.

(c) Verify that J1-C on C & SMPG/A2 is -6 V.

3.14 Replace removed cable on J5 and depress ZERO INDICATOR RESET.

3.15 (Visual Indication and Test Monitor Points)

(a) Verify that Zero Indicator is extinguished.

(b) Verify J1-B on C & SMPG/A2 is -6 V.

(c) Verify J1-C on C & SMPG/A2 is 0 V.

3.16 Monitor C_2X_1 with oscilloscope throughout test and record message pattern when cable is off and coop button is activated and deactivated.

4. Equipment in Test

Data Analysis Central - AN/GYK-2

Message Simulator - 25-29584-1

Launch Control Console - 25-24172-11

Cable Simulator - 8318157-501

Patch Panel - 25-29327-2

5. Test Equipment Required

5.1 Oscilloscope - Tektronix 545

5.2 Voltmeter - Fluke 801

5.3 Oscillograph Recorder

6. Data Requirements

Record the signals per Table 1.1.4.10-1 in step 3.16.

Tape Channel Number	Gain	DC/AC	Signal Monitor Point	Signal Characteristics	Oscillograph Scale Volts/Inch
1	0.5	AC	MX1	1300 cps Diphase	4.0
2	0.5	AC	C2X1	↓	4.0
3	5.0	AC	C2R1	↓	0.4
4					
5					
6					
7					
8					
9					
10					
11					
12	1.0	AC	Audio Osc.	2 volt p-p 1300 cps	2.0
13	–	AC		Voice	
14	1.0	AC	2-44	Time Code, 100 pps	1.0

Table 1.1.4.10-1

TEST 1.1.4.11

1. Title

   LCP/DAC Message Injection

2. Objectives

   2.1 To determine that all message injection gates function and that all inputs to the "All Zero" gate function.

   2.2 To determine that Message injection begins after completion of retransmission.

   2.3 To determine that the LCC can initiate Launch, Inhibit, Calibrate, SCN Test, Test, Target messages.

3. Description

   3.1 Connect equipment per Figures 1.3.1.1-1 and 1.1.4.11.-1.

   3.2 Install Breakwire Encoder Simulator in place of LCC.

   3.3 Connect Message Simulator patchboard outputs MX_1 through MX_{10} to 23 mile Cable Simulator.

   3.4 Connect Cable Simulators outputs to inputs C_2R_1 through C_2R_{10}.

   3.5 Program the Message Simulator to produce all "1's" on 9 lines and a sync and "1" - "0" alternating message on C_2R_1.

   3.6 Connect an oscilloscope to C_2R_1 and trigger with the inject pulse signal obtained from SMPG/A2 J1-J.

   3.7 Program the Encoder Simulator to inject all "1's" except the first bit.

   3.8 Verify the 1st bit of diphase message is "0" by observing oscilloscope display. Permutate the "0" bit through the remaining 55 bits and observe that diphase reflects each change. (Note: The Coop Switch on the SMPG rack must be activated during check of last 10 bits).

3.9 Program the Encoder Simulator to inject "0's" in the first 13 bits and "1's" in the remaining bits.

3.10 Verify that oscilloscope reflects the encoded message.

3.11 Progressively make bits 15, bits 15 & 16, bits 15, 16 & 17, etc., of the message in step 3.9 "0's" and verify that oscilloscope display reflects injected message. (When bits 15 to 25 are "0's" the test can be stopped.)

3.12 Disconnect the Breakwire Encoder Simulator and connect the LCC.

3.13 Initiate Launch, Inhibit, Calibrate, Test, Target, and SCN Test with all Launcher addresses and verify by examination of oscilloscope that bit structure agrees with Figure 1.3.1.1-3.

3.14 Verify by recording diphase that message injection begins at the end of 18 retransmitted messages.

4. Equipment in Test

4.1 Data Analysis Central - AN/GYK-2

4.2 Launch Control Console - 25-24172-11

4.3 Message Simulator - 25-29584-1

4.4 Breakwire Encoder Simulator - 25-30945

4.5 Cable Simulator - 8318157-501

4.6 Patch Panel - 25-29327-2

5. Test Equipment Required

5.1 Oscilloscope - Tektronix 545

5.2 Voltmeter - Fluke 801

5.3 Breakwire Encoder Simulator

5.4 NRA Instrumentation System - 25-33093-8

6. Data Requirements

Record data per step 3.14 and Table 1.1.4.11-1.

Tape Channel Number	Gain	DC/AC	* Signal Monitor Point	Signal Characteristics	Oscillograph Scale Volts/Inch
1					
2	0.5	AC	C2X1	1300 cps Diphase	4.0
3	0.167	DC	305J5-58	0 to -6 V, Initiate	12.0
4	0.167	DC	305J5-59	0 to -6 V, Coop Hold	12.0
5	0.167	DC	305J5-2	0 to -6 V, Bit #1	
6	1.0	DC	305J5-68	Common	2.0
7					
8					
9					
10					
11					
12	1.0	AC	Audio Osc.	2 volt p-p 1300 cps	2.0
13	—	AC	—	Voice	—
14	1.0	AC	2-44	Time Code, 100 pps	1.0

* Use Instrumentation Breakout Box #6 for Cable W006 (305J5)

Table 1.1.4.11-1

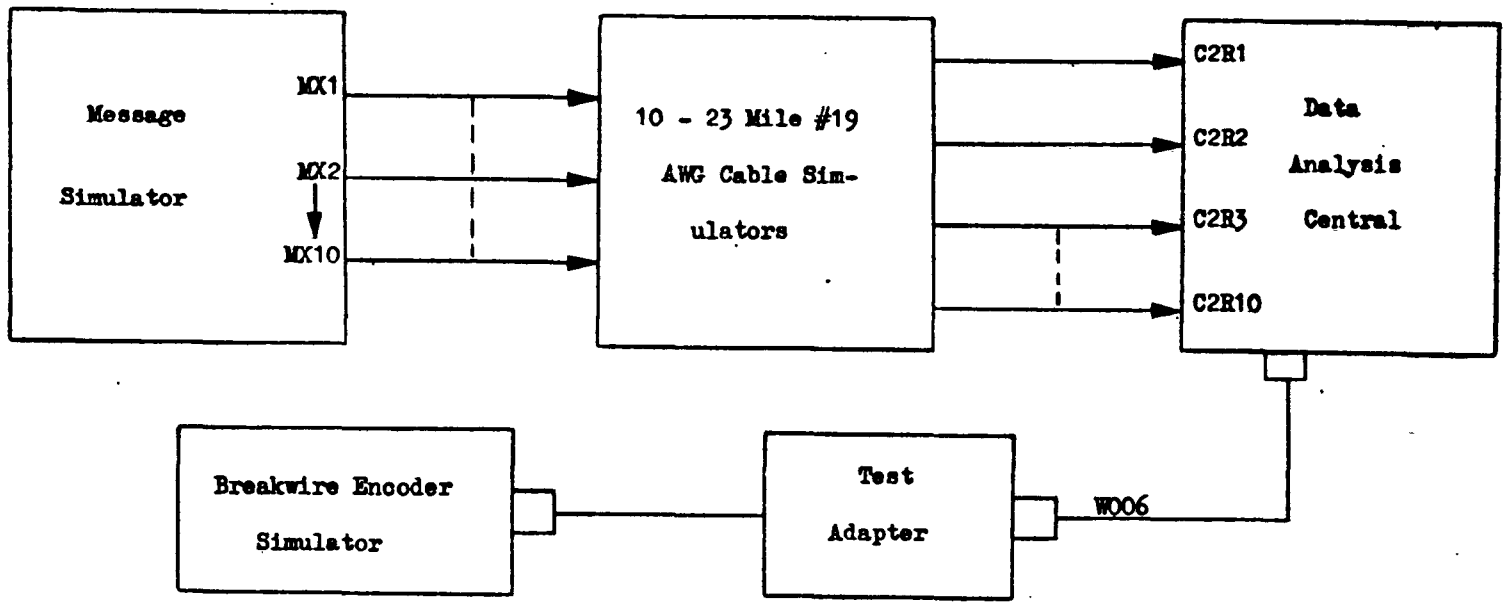


Figure 1.1.4.11-1

Test 1.1.5.1

1. Title

SIN Ring Generate Test (LCC) and Integration of DDG, CCP and CCC.

2. Objectives

To verify the ringing tone is generated by the SIN TTE and is transmitted through the Digital Data Group, Ringing Unit.

3. Description

3.1 Connect the equipment as shown in Figures 1.3.1.1-1 and 1.1.5.1-1.

3.2 Perform the ring functions in Col. 1, Table 1.1.5.1-1, by pressing the LF ring buttons on the CCC and the CCP. If this is not possible, jumper J3 on the TA-464/GTC-S repeater drawers as shown in Col. 2. The two drawers are identical; the upper drawer contains the ringing equipment for LF #1 thru LF #5; the lower drawer for LF #6 thru LF #10.

3.3 Measure 2600 cps on the upper drawer for LF #1 thru #5, and the lower drawer for LF #6 thru LF #10 (Col. 3).

3.4 Measure the same signal on the ringing unit MX 3681 thru MX 3685 (Col. 4). Terminate the meter with 600 ohms.

3.5 Measure the output signal (Col. 6) at the same time for each test; terminate the meter in 470 ohms when monitoring the cable test points.

4. Equipment in Test

4.1 Digital Data Group OA 3541

4.2 Telephone Connecting and Switching Set AN/GTC-8

4.3 Communications Control Panel C-3937/GTC

4.3.1 LCC

4.3.2 CCC

4.4 Patch Panel 25-29327-2

5. Test Equipment Required

5.1 Frequency Counter - Berkeley 554B

5.2 VTVM HP 400C

5.3 Oscilloscope - Tektronic 545

6. Data Requirements

Record all data in the Test Log.

Test Conditions			Test Monitor Points and Expected Signals			
			Output of TTE	Input to DDG Ring Unit	Output of DDG Ring Unit	Output of DDG
	#1	#2	#3	#4	#5	#6
	Perform this ring function or	Repeater TA 464/GTC-8 Jumper	Measure 2600 cps at 0±1.5 dbm - TA 464/GTC-8	Measure 2600 cps at 0±1.5 dbm on MX 3681-5	Measure 2600 cps at -10±1.5 dbm on MX 3681-5	Measure 2600 cps at 10±1.5 dbm
1	L 2	J3-HH, F (Upper)	J3-h, i (Upper)	J1-h, g	J1-m, n	J13-25, -26
2	L 3	J3-HH, G (Upper)	J3-j, k (Upper)	J1-b, d	J1-f, e	J13-27, -28
3	L 4	J3-HH, H (Upper)	J3-m, n (Upper)	J1-GG, HH	J1-FF, EE	J13-29, -30
4	L 5	J3-HH, J (Upper)	J3-p, q (Upper)	J1-DD, CC	J1-BB, AA	J13-31, -32
5	L 6	J3-HH, K (Upper)	J3-r, s (Upper)	J1-Y, Z	J1-X, W	J13-33, -34
6	L 7	J3-HH, F (Lower)	J3-h, i (Lower)	J1-S, T	J1-U, V	J7-25, -26
7	L 8	J3-HH, G (Lower)	J3-j, k (Lower)	J1-N, P	J1-i, R	J7-27, -28
8	L 9	J3-HH, H (Lower)	J3-m, n (Lower)	J1-M, L	J1-J, K	J7-29, -30
9	L 10	J3-HH, J (Lower)	J3-p, q (Lower)	J1-G, H	J1-E, F	J7-31, -32
10	L 11	J3-HH, K (Lower)	J3-r, s (Lower)	J1-C, D	J1-A, B	J7-33, -34

Table 1.1.5.1-1

Test Conditions			Test Monitor Points and Expected Signals			
			Output of TTE	Input to DDG Ring Unit	Output of DDG Ring Unit	Output of DDG
	#1	#2	#3	#4	#5	#6
	Perform this ring function or	Repeater TA 464/GTC-8 Jumper	Measure 2600 cps at 0±1.5 dbm - TA 464/GTC-8	Measure 2600 cps at 0±1.5 dbm on MX 3681-5	Measure 2600 cps at -10±1.5 dbm on MX 3681-5	Measure 2600 cps at 40±1.5 dbm
1	L 2	J3-HH, F (Upper)	J3-h, i (Upper)	J1-h, g	J1-m, n	J13-25, -26
2	L 3	J3-HH, G (Upper)	J3-j, k (Upper)	J1-b, d	J1-f, e	J13-27, -28
3	L 4	J3-HH, H (Upper)	J3-m, n (Upper)	J1-GG, HH	J1-FF, EE	J13-29, -30
4	L 5	J3-HH, J (Upper)	J3-p, q (Upper)	J1-DD, CC	J1-BB, AA	J13-31, -32
5	L 6	J3-HH, K (Upper)	J3-r, s (Upper)	J1-Y, Z	J1-X, W	J13-33, -34
6	L 7	J3-HH, F (Lower)	J3-h, i (Lower)	J1-S, T	J1-U, V	J7-25, -26
7	L 8	J3-HH, G (Lower)	J3-j, k (Lower)	J1-N, P	J1-i, R	J7-27, -28
8	L 9	J3-HH, H (Lower)	J3-m, n (Lower)	J1-M, L	J1-J, K	J7-29, -30
9	L 10	J3-HH, J (Lower)	J3-p, q (Lower)	J1-G, H	J1-E, F	J7-31, -32
10	L 11	J3-HH, K (Lower)	J3-r, s (Lower)	J1-C, D	J1-A, B	J7-33, -34

Table 1.1.5.1-1

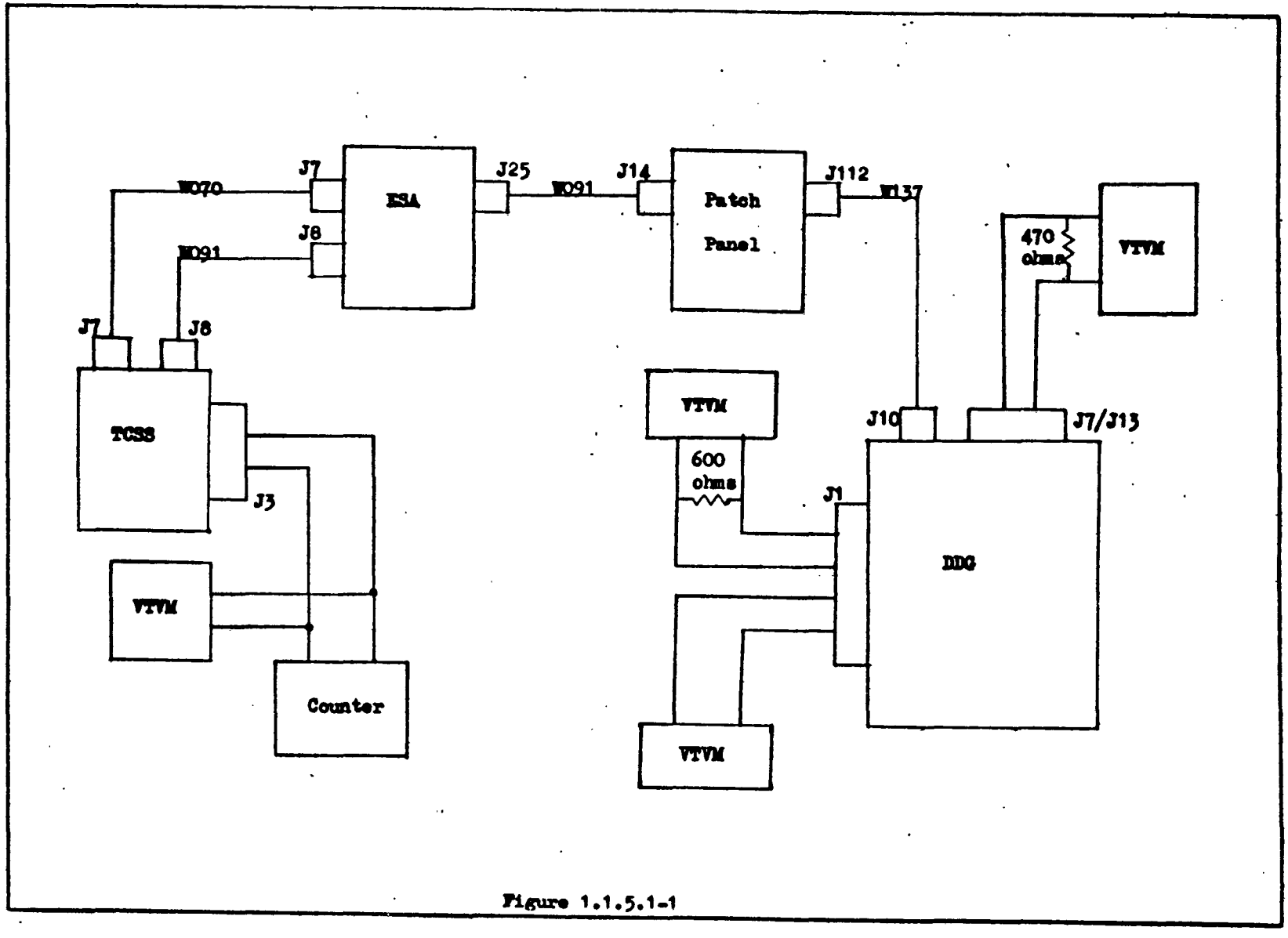


Figure 1.1.5.1-1

TEST 1.1.5.3

1. Title

   LCC Ringing Unit Test MX 3681-85 and Integration of DDG, CCP & CCC.

2. Objectives

   2.1 To verify ringing functions for SCS, HVC.

   2.2 To verify that HVC Receive circuits function.

3. Description

   3.1 Connect the equipment as shown in Figures 1.1.3.1-1 and 1.1.5.3-1.

   3.2 Perform the ringing functions as shown in Table 1.1.5.3-1. Jumper to simulate the function.

   3.3 Monitor the output frequencies (Col. 7) for a level of -6 dbm tolerance ± 3 dbm; frequency of the signal to be ± 10 cycles.

   3.4 The last two items on the lists require an input signal to operate the tone detectors.

   3.5 Column 5 will have a level of -3 dbm to -9 dbm; frequency of the signals to be ± 25 cycles.

   3.6 Connect the equipment per Figure 1.1.5.3-2.

   3.7 Inject 2200 ± 10 cps signal of 3 - 10 mv to J13-15, 16 for 10 seconds to obtain a tone at the CCC for 30 ± 6 seconds. Verify minimum signal level.

   3.8 Repeat (3.7) using 1400 ± 10 cps input.

4. Equipment in Test

   4.1 Digital Data Group OA 3541, (Rack 303)

   4.2 Communications Control Console OA 3460/GSW-4

5. Test Equipment Required

5.1 Differential Voltmeter - Fluke 803

5.2 VTVM HP 400C

5.3 Frequency Meter - Berkeley 554B

5.4 Audio Oscillator HP 207A

5.5 Multimeter - Simpson 260

6. Data Requirements

Record all data in the Test Log.

TESTS CONDITION		TEST MONITOR POINTS - MX 3681				
1 Perform this function or→	2 Jumper J2-	3 Monitor output freq. in cps.	4 Monitor Location J1-	5 Monitor -3 to -9 dbm at output/DDG	6 Monitor Location J2-	7 Monitor -6 ±3 dbm at Output/DDG
SCS - L2 Safe	B, V	3400 ± 10	n, m			J13-25, -26
SCS - L3 Safe	B, Y	3400 ± 10	f, e			J13-27, -28
SCS - L4 Safe	B, Z		FF, EE			J13-29, -30
SCS - L5 Safe	B, X		BB, AA			J13-31, -32
SCS - L6 Safe	B, W		X, W			J13-33, -34
SCS - L7 Safe	B, U		U, V			J7-25, -26
SCS - L8 Safe	B, T		i, R			J7-27, -28
SCS -L9 Safe	B, S		K, J			J7-29, -30
SCS -L10 Safe	B, AA		E, F			J7-31, -32
SCS -L11 Safe	B, BB	3400 ± 10	A, B			J7-33, -34
VRSA Tone (ON)		2900 ± 10	r, t			
HVC - Ring 2	N, J	1700 ± 25		J13-12, -13	D, C	
HVC - Ring 3	N, M	2500 ± 25			D, C	
HVC - Ring 4	N, K	2800 ± 25				
HVC - Ring 5	N, H	3100 ± 25				
HVC - Ring All	N, L	2200 ± 25		J13-12, -13	D, C	

TEST CONDITIONS			TEST MONITOR POINTS		
Perform this Input or **Jumper to Sim.**	Apply for approx. 10 sec.	Input freq. in cps ± 1%	Location LCF/DDG	Jumper on Drawer	Measure 28V for .5 Min. DDG
HVC - Ring All	3 - 10 MU	2200	J13-15, -16	J2-P, R	J5-8, -9
HVC - Ring One	3 - 10 MU	1400	J13-15, -16	J2-P, R	J5-8, -9
	From 600 ± 30 ohm source.				

1 Terminate cable connections in 470 ± 24 ohms.

Table 1.1.5.3-1

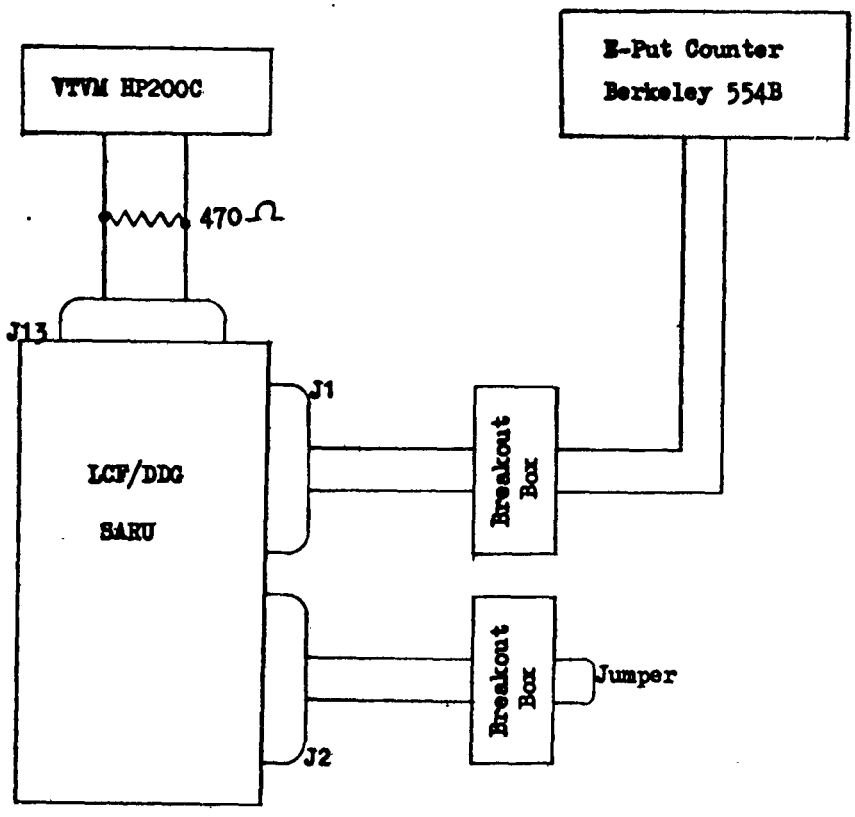


Figure 1.1.5.3-1

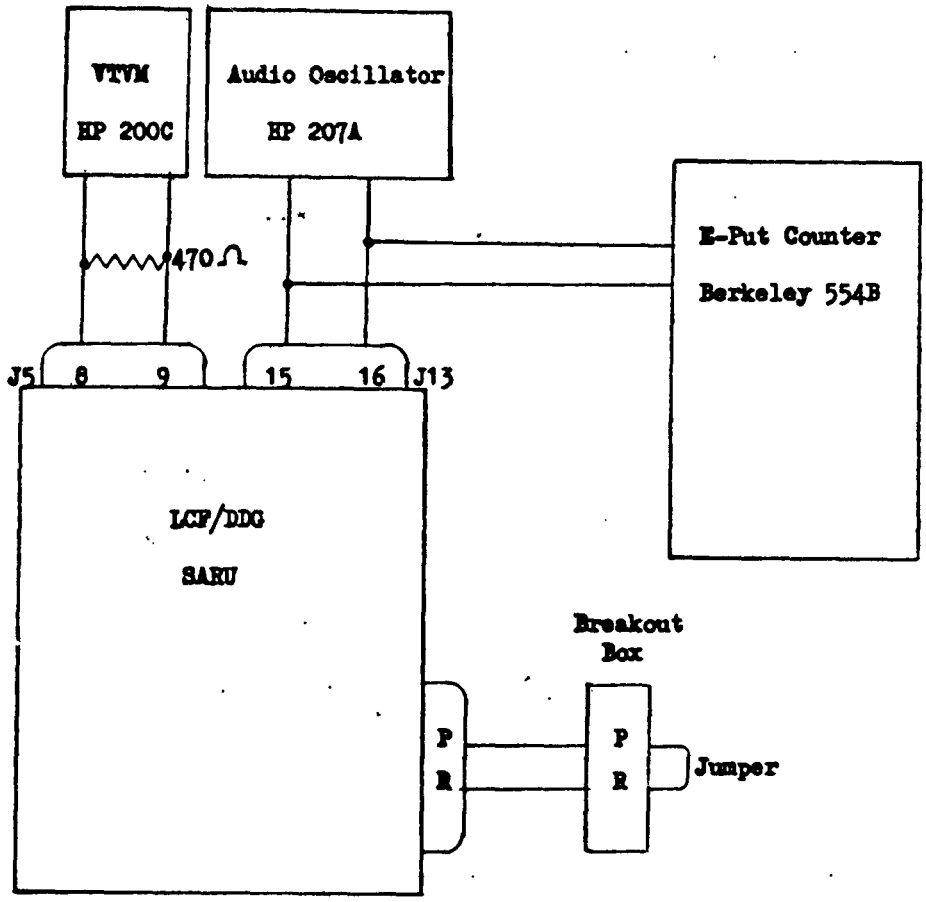


Figure 1.1.5.3-2

TEST 1.1.5.4

1. Title

LCF/DAC VRSA Receiver Test and VRSA Monitor.

2. Objectives

To determine that SIM Receive equalization and gain are correctly adjusted.

3. Description

3.1 Connect the equipment per Figure 1.3.1.1-1, and 1.1.5.4-1.

3.2 Install cable breakout boxes on J1, J2 and J6 on top of DDG. Do not connect removed cable.

3.3 Connect a 600 ± 30 ohm source signal generator to the input connections noted on Table 1.1.5.4-1.

3.4 Terminate the output connections in Table 1.1.5.4-1 with a 470 ohm ± 24 ohm resistance.

3.5 Adjust equalizer resistance as follows: 21 ohms (Straps A, B, D, F, H on TB1 thru TB10; Low Level Adjustment).

3.6 Gain is initially adjusted when step 1 of Table 1.1.5.4-1 is performed for each channel.

3.7 Perform each step on Table 1.1.5.4-1 and observe results; also verify that tone can be monitored at P.A. Speaker on CCC for each LF.

4. Equipment in Test

4.1 Data Analysis Central - AN/GYK-2

4.2 Communications Control Console 25-27095-2

5. Test Equipment Required

5.1 Oscilloscope - Tektronix 545

5.2 Cable Breakout Boxes

5.3 VTVM HP 400C

5.4 Signal Generater HP 207A

5.5 Frequency Counter - Berkeley 554B

5.6 Differential Voltmeter - Fluke 803

6. Data Requirements

Record data for each channel in Test Log.

Test Conditions				Test Monitor Points and Expected Signals	
Test Step	Input Connections	Input Frequency cps.	Input Level	Output Connections	Output Level
					▷2
1	J1-22, -23	1000	10 mv ▷1	J6-2, -3	7 ± 1 dbm
2	J1-24, -25	↓	↓	J6-4, -5	↓
3	J1-26, -27			J6-6, -7	
4	J1-28, -29			J6-8, -9	
5	J1-30, -31			J6-10, -11	
6	J2-22, -23			J6-12, -13	
7	J2-24, -25			J6-14, -15	
8	J2-26, -27			J6-16, -17	
9	J2-28, -29			J6-18, -19	
10	J2-30, -31			J6-20, -21	

▷1 Supply the following inputs and verify that output remains constant:

Input Frequency	Input Level (mv RMS)
300	10-18
500	9-17
700	8-15
1400	6-11
2100	5-10
3100	5-9

▷2 Add 1.06 dbm to adjust for 470 ohm shunt

Table 7.1.5.4-1

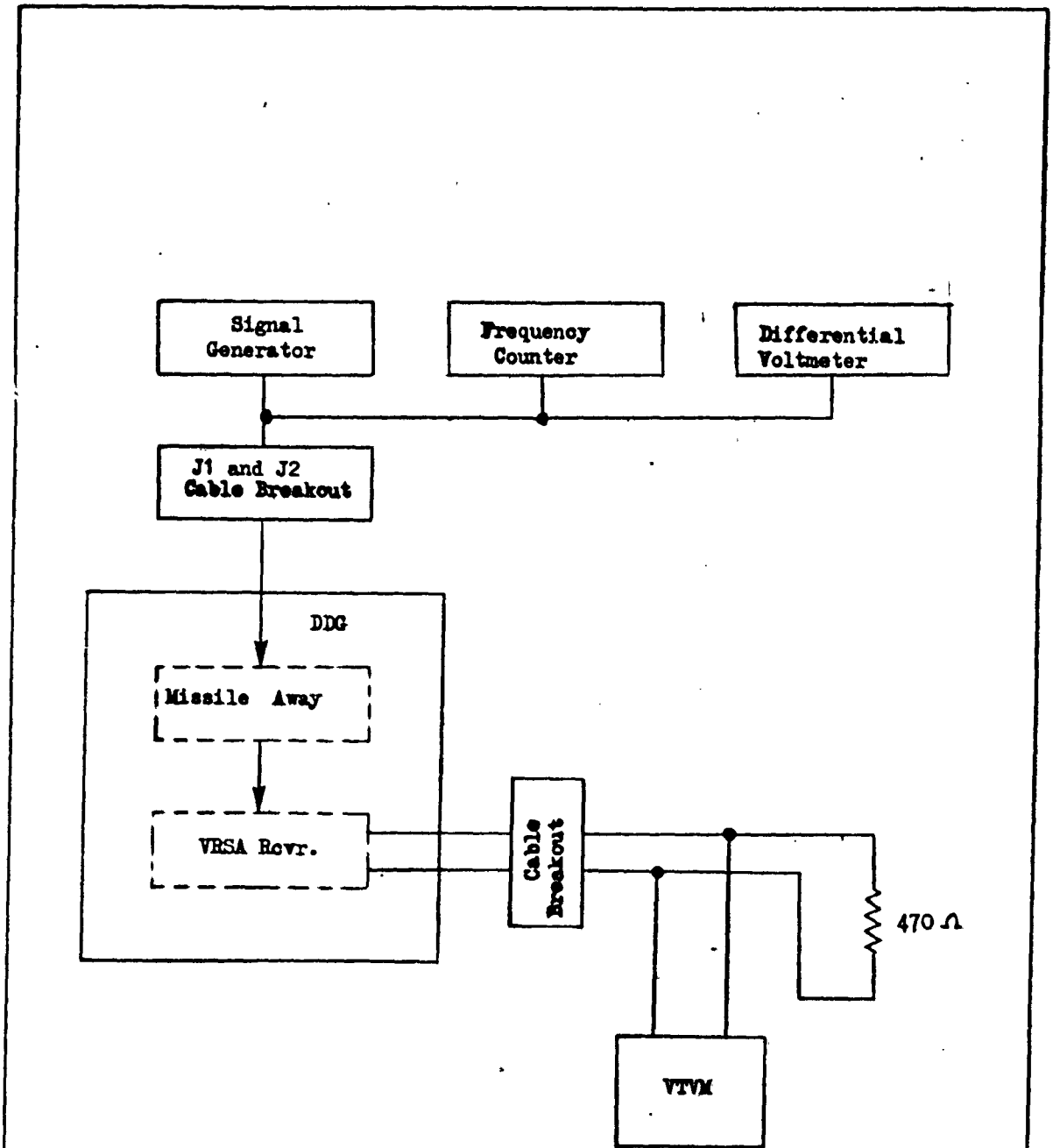


Figure 1.1.5.4-1

TEST 1.1.5.5

1. Title

   LCF Ring Unit Test, VRSA Interrogation and Integration of the Communications Control Console.

2. Objectives

   2.1 To verify operation of VRSA interrogate switch.

   2.2 To verify that the output levels of VRSA Interrogation are within -6 ± 3 dbm. and 2900 ± 10 cps.

3. Description

   3.1 Connect the equipment as shown in Figure 1.1.5.5-1.

   3.2 Engage Launch Enable Switch to eliminate "safe" signal from the line.

   3.3 Measure the VRSA tone at the output points as indicated by Table 1.1.5.5-1.

4. Equipment in Test

   Digital Data Group OA 3541 (Rack 303)

   Ringing Unit MX 3681-5

   Communications Control Console 25-27095-2

5. Test Equipment Required

   Oscilloscope (Tektronix 545 or equivalent)

   RMS VTVM

   E-Put Meter

6. Data Requirements

   Record all data in the Test Log.

VRSA Interrogate	Monitor Output pts.	Frequency Output	Output Level
L2	J13 - 25, -26	2900 ± 10 cps	-6 ± 3 dbm
L3	J13 - 27, -28	2900 ± 10 cps	-6 ± 3 dbm
L4	J13 - 29, -30	2900 ± 10 cps	-6 ± 3 dbm
L5	J13 - 31, -32	2900 ± 10 cps	-6 ± 3 dbm
L6	J13 - 33, -34	2900 ± 10 cps	-6 ± 3 dbm
L7	J7 - 25, -26	2900 ± 10 cps	-6 ± 3 dbm
L8	J7 - 27, -28	2900 ± 10 cps	-6 ± 3 dbm
L9	J7 - 29, -30	2900 ± 10 cps	-6 ± 3 dbm
L10	J7 - 31, -32	2900 ± 10 cps	-6 ± 3 dbm
L11	J7 - 33, -34	2900 ± 10 cps	-6 ± 3 dbm

1 Add 1.06 dbm for 470 ohm correction.

Table 1.1.5.5-1

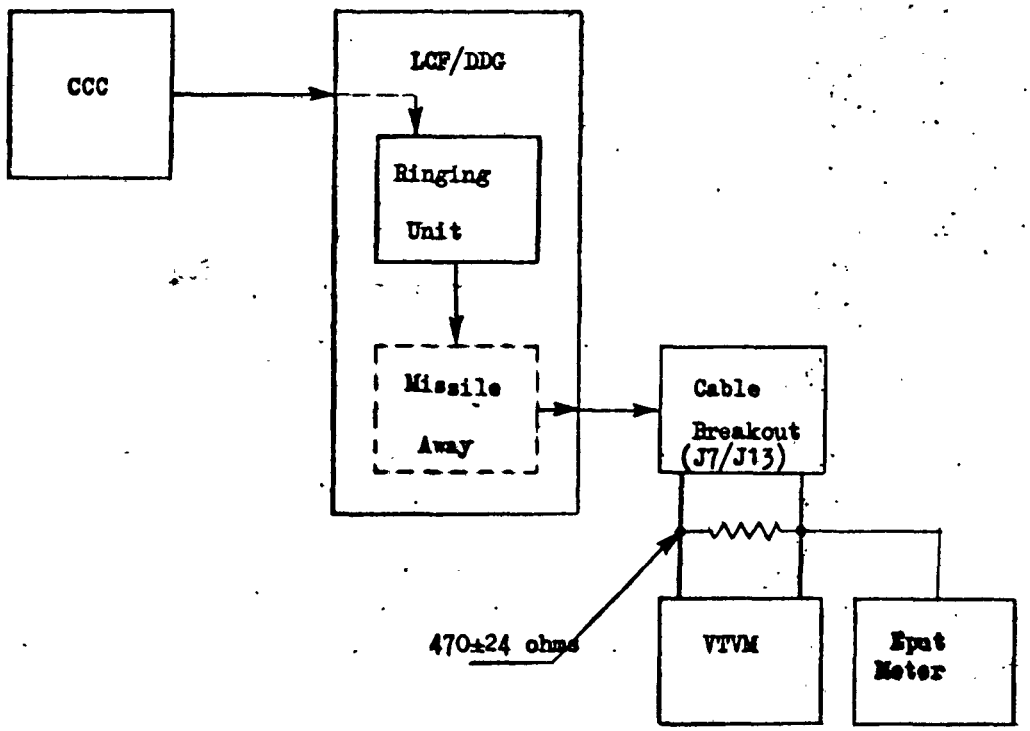


Figure 1.1.5.5-1

TEST 1.2.1.1

1. Title

S&M Simulator Integration with LF/DAC.

2. Objectives

To verify functional compatibility of the S&M Simulator and the LF Data Analysis Central.

3. Description

3.1 The S&M Simulator shall be functionally tested per D2-13806.

3.2 Connect the equipment per Figures 1.3.1.1-1 and 1.3,1.1-2.

3.3 Turn on the LF/DAC. NOTE: the Site Tailoring Plug shall not be used.

3.4 Turn on power at the S&M Simulator. Place the DECODER switch in the IN position.

3.5 Place the INTERNAL/EXTERNAL switch in the EXTERNAL position.

3.6 Momentarily depress the RESET lever.

3.7 Reset the LF/DAC.

3.8 Connect the Message Simulator outputs MX_1 through MX_6 to the LF Receive lines F2R1 to F2R6, in that respective order.

3.9 Program the Message Simulator per Figure 1.2.1.1-2.

3.10 Monitor the status message at F2ST for STRATEGIC ALERT and ARMED. (Monitor the status message at F2ST for a bit structure as indicated in Table 1.2.1.1-1).

3.11 Depress the ALARM lever at the S&M Simulator.

3.12 Release the ALARM lever.

3.13 Momentarily depress the INNER SECURITY VIOLATED lever at the Simulator.

3.14 Reset the Simulator.

3.15 Momentarily depress the INNER SECURITY VIOLATED lever at the Simulator.

3.16 Momentarily depress the OUTER SECURITY VIOLATED lever at the Simulator.

3.17 Reset the Simulator.

3.18 Momentarily depress the WARHEAD ALARM button on the Simulator.

3.19 Reset the Simulator.

3.20 Press the Message Sim. button to send 20 LCF #2 LAUNCH B messages, followed by 10 LCF #1 LAUNCH A messages on line 6.

3.21 Reset the DECODER in the Simulator.

3.22 Reset the Simulator.

3.23 Reset the LF/DAC and verify that the status message is per Table 1.2.1.1-1, step 10.

3.24 Program the Message Simulator per Figure 1.2.1.1-3.

3.25 Initiate SCN Test messages on line 1, by pressing the Message Sim. RESET button.

3.26 Remove the patchcord from terminal 15 and reconnect to terminal T of the Message Simulator patchboard.

3.27 Send Test messages on line 1 (F2R1) by pressing the Message Sim. RESET button.

3.28 Remove the patchcord from terminal T and reconnect to terminal C of the Message Simulator.

3.29 Send Calibrate messages on line 1 by pressing the Message Sim. RESET button.

3.30 Repatch equipment as shown in Figure 1.2.1.1-1.

3.31 Program Message Simulator as shown in Figure 1.2.1.1-4. Verify all marks transmission on all six lines.

3.32 Verify that LF2 Indicator Panel at the LCC indicates STRATEGIC ALERT and ARMED. Reset equipment if necessary.

3.33 Simulate an LEU Fault at the LF/SCN by connecting 401A5J1-S to ground at 401A7J2-G. The LEU Fault lamp at the SCN should light.

3.34 The status message should indicate a NO-GO (Fault without Strategic Alert).

3.35 Remove the Fault and reset the SCN. The Fault lamp should go out.

3.36 Simulate loss of transmit tone on Line 1 by grounding 402A4J1-g at CV1254.

3.37 The status message should indicate an Alarm (Fault with Strategic Alert).

3.38 The MRU lamp at the S&M should be on.

3.39 Remove the Fault - the MRU lamp should go out.

3.40 Simulate a Line Selector Fault by grounding 402A3J1-T (CT22). Send an SCNT to the LF on Line 1 and verify that a NO-GO status is produced by the LF (all marks on Receive lines 2 - 5).

3.41 The LSU Fault lamp at the S&M should go on.

3.42 Remove the fault and reset the LF/SCN.

3.43 Simulate a Line Moniter fault by removing tone (at F2R1) from Receive Line No. 1. The S&M LMU fault lamp should go on. The status message should indicate an ALARM (FAULT-STRATEGIC ALERT) condition.

3.44 Replace tone on Line 1 and verify that the fault indication at the S&M is removed.

3.45 Simulate a Net Traffic Fault by sending an invalid message to the LF (reference Figure 1.3.1.1-3).

3.46 A Fault with Strategic Alert status should be transmitted from the LF. The NT lamp at the S&M should turn on. The fault condition should remain until the LF is reset or per step 3.44.

3.47 Verify that a Net Traffic Fault will be reset by an INHIBIT message or a LAUNCH message or an SCNT on Line 1.

3.48 Verify that a TEST or CAL message on Line 2 produces a Net Traffic Fault.

3.49 Verify that a SCNT message on Line 2 does not reset the Net Traffic Fault.

3.50 Reset the LF/SCN.

3.51 Simulate a Detector, Command Signals Fault by grounding 401A6J1-N. The MDU Fault lamp at the S&M should illuminate.

4. Equipment in Test

4.1 S&M Signal Simulator 25-25085-1

4.2 LF Data Analysis Central AN/GYK-2

4.3 Message Simulator 25-29584-1

4.4 Patch Panel & Cable Simulator 25-29327-1

5. Test Equipment Required

5.1 Oscilloscope, Tektronix 545A or 555.

5.2 Preamp, Tektronix Type CA

6. Data Requirements

6.1 Record all data and observations in the Test Log.

7. References

D2-13406, S&M Simulator Test Procedure

TABLE 1.2.1.1-1

Step	Status Message Bits [1]												Approx. Delay
	1	2	3	4	5	6	7	8	9	10	11	18 [2]	
3.10	1	0	0	0	0	0	1	0	1	0	1	1	[3]
3.11	1	0	0	0	1	0	1	0	1	0	1	1	
3.13	1	0	0	0	1	0	1	0	1	0	0	1	
3.14	1	0	0	0	0	0	1	0	1	0	1	1	
3.15	1	0	1	0	0	0	1	0	1	0	1	1	
3.16	1	0	1	1	0	0	1	0	1	0	1	1	
3.17	1	0	0	0	0	0	1	0	1	0	1	1	
3.18	1	0	0	0	1	1	1	0	1	0	0	1	
3.19	1	0	0	0	0	0	1	0	1	0	1	1	
3.20a	1	1	0	0	0	0	1	0	1	0	1	1	[3]
b	1	1	0	0	0	0	1	1	1	0	0	1	5 sec.
c	1	1	1	1	0	0	1	1	1	0	0	1	25 "
d	1	1	1	1	1	0	1	0	1	0	0	1	35 "
3.21	1	0	0	0	0	0	1	0	1	1	0	1	[3]
3.25a	1	0	0	0	0	0	1	1	1	1	1	1	[3]
b	1	0	0	0	0	0	1	0	1	0	1	1	10 sec.
3.27a	1	0	0	0	0	0	1	0	1	1	0	1	3
b	1	0	0	0	0	0	1	0	1	0	1	1	60 sec.
3.29a	1	0	0	0	0	0	1	0	1	1	0	1	[3]
b	1	0	0	0	0	0	1	0	1	0	1	1	60 sec.

[1] Bits 12-17 and bits 19-32 are always zeros.

[2] Bits 1, 9 and 18 are always marks.

[3] Less than 01 sec.

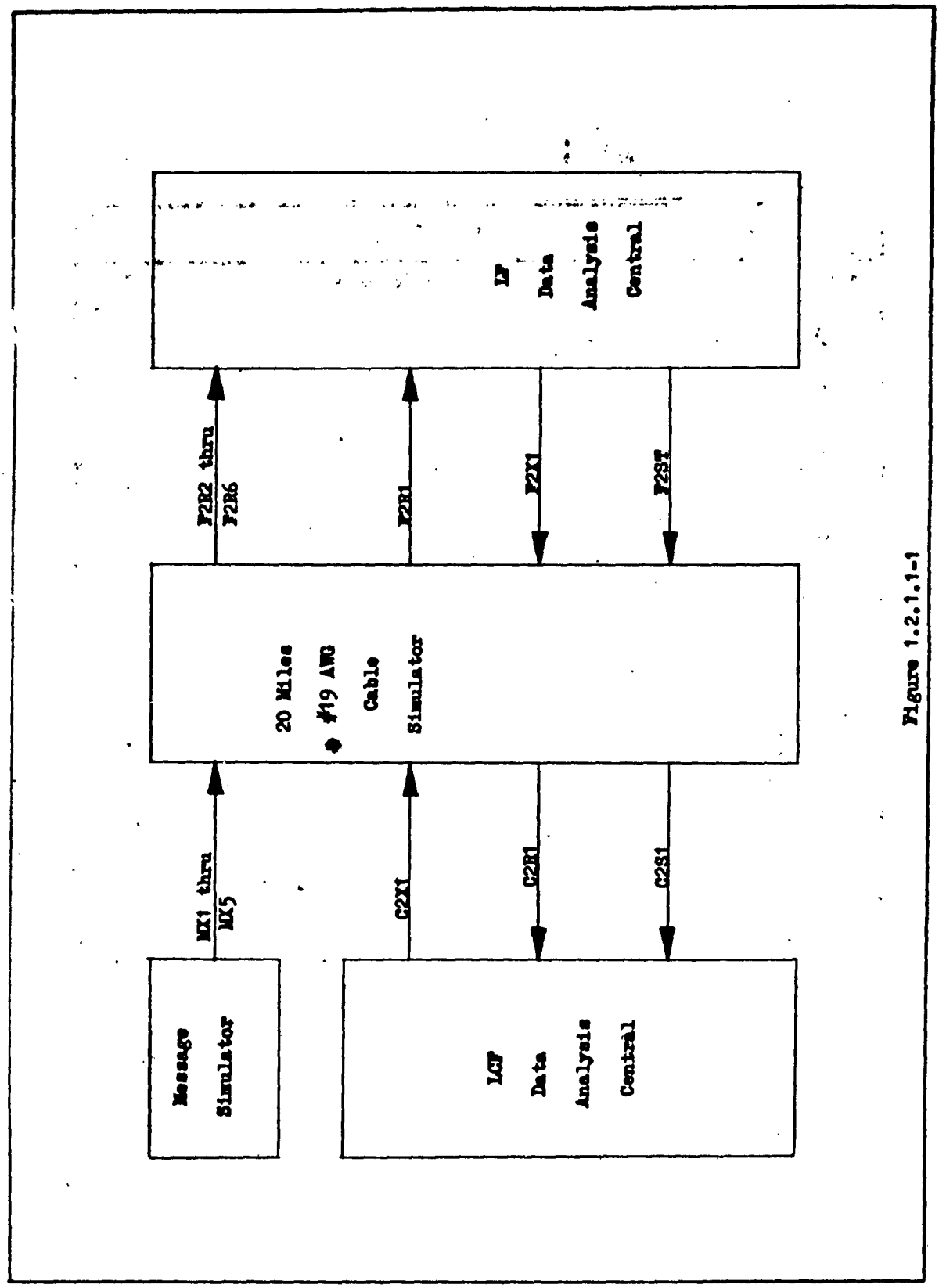
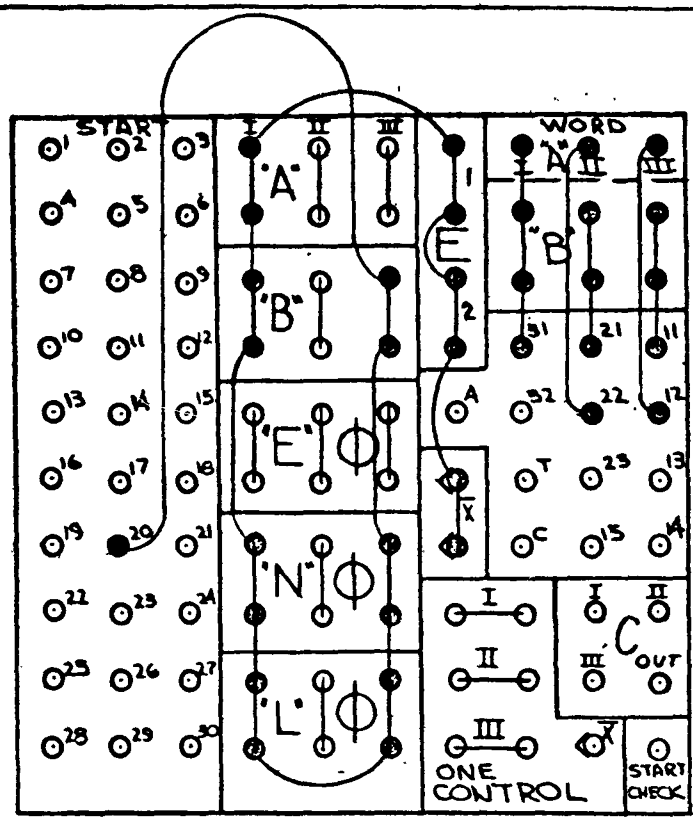


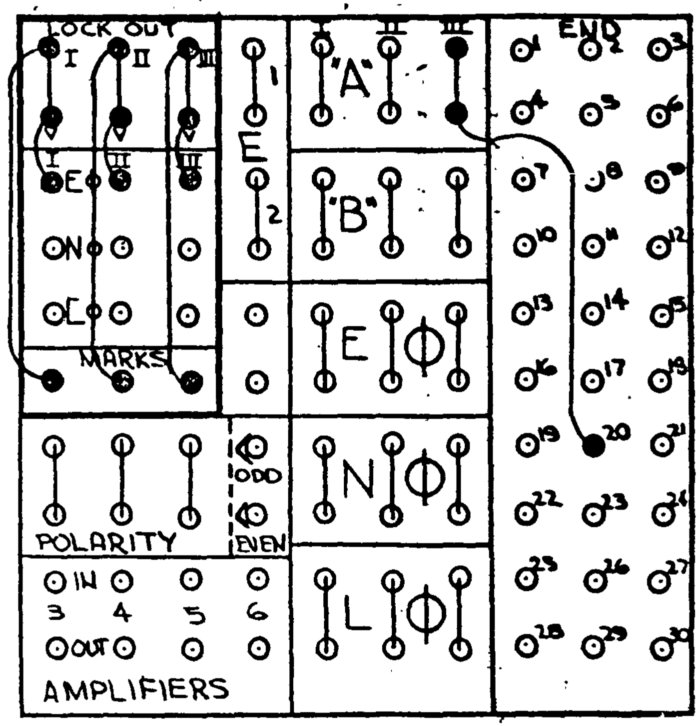
Figure 1.2.1.1-1



Control Panel Settings:

2X TNR Up
EXT. XMTR Up
CONT. Up
N ø Aux.
L ø Aux.

ERROR STOP Off
ERROR DISPLAY | 0 | 0 |
OPERATION ______
TRANSLATOR ______

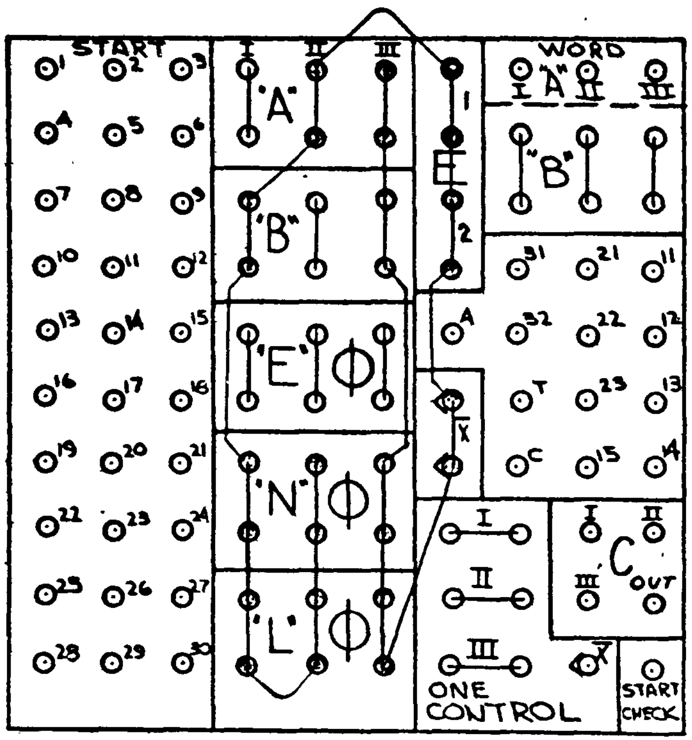


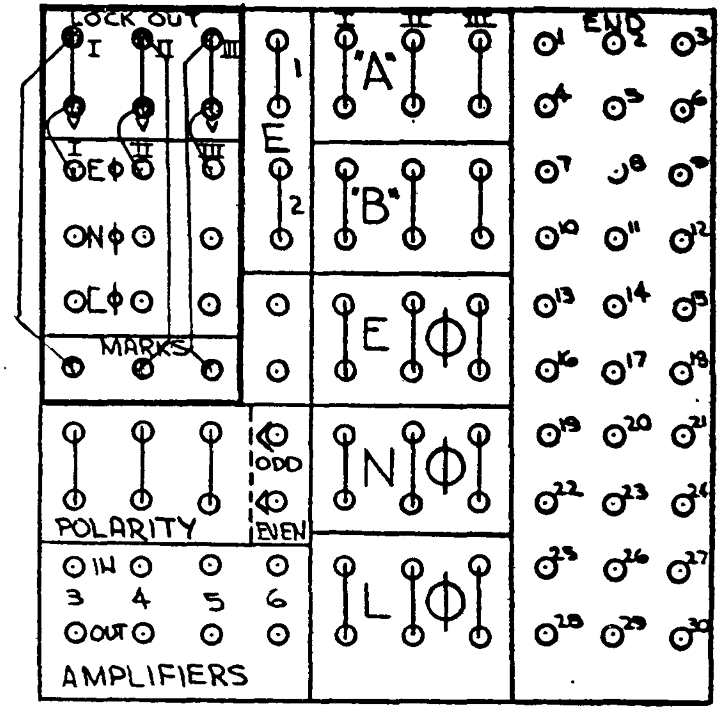
Code Panel Settings:

XMTR LENGTH 20   TNR LENGTH 20
56/32 BIT 56
XMTR LINES 0 0 0 0 0 ● 0 0 0 0
1 2 3 4 5 6 7 8 9 10

Message Simulator Program

Figure 1.2.1.1-2





Control Panel Settings:

2X TNR ____Up____
EXT. XMTR ____Up____
CONT. ____Up____
N ∅ ____Aux.____
L ∅ ____Aux.____

ERROR STOP ____Off____
ERROR DISPLAY __0__0__
OPERATION ____Off____
TRANSLATOR ____Off____

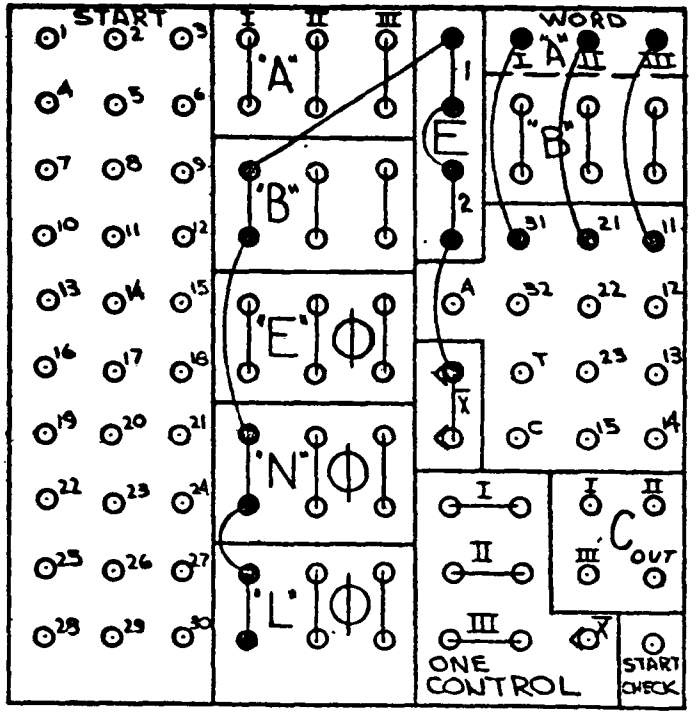
Code Panel Settings:

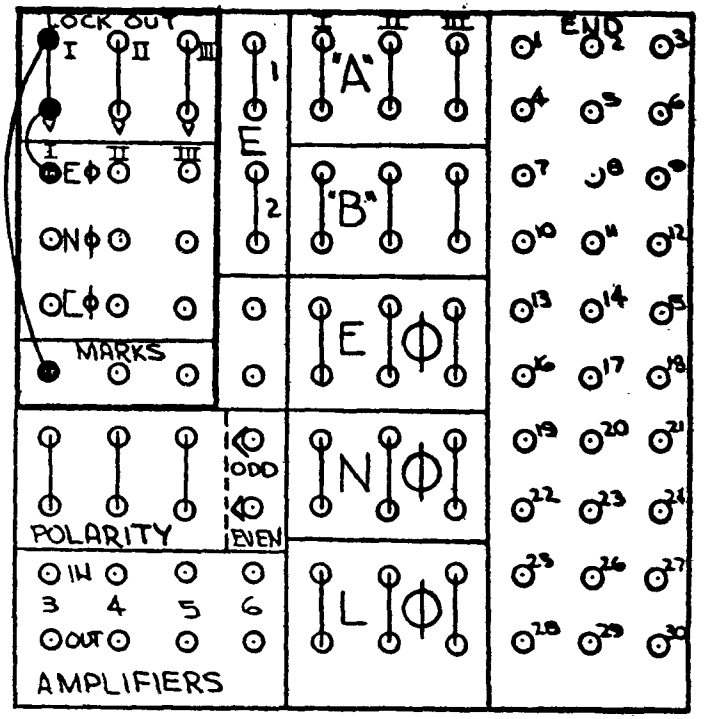
XMTR LENGTH ____Inf.____   TNR LENGTH ____Inf.____
56/32 BIT ____56____

XMTR LINES ● 0 0 0 0 0 0 0 0 0
1 2 3 4 5 6 7 8 9 10

Message Simulator Program

Figure 1.2.1.1-3





Control Panel Settings:

2X TNR	UP	ERROR STOP	OFF
EXT. XMTR	UP	ERROR DISPLAY	0 0
CONT.	UP	OPERATION	
N Ø	Aux.	TRANSLATOR	
L Ø	Aux.		

Code Panel Settings:

XMTR LENGTH Inf. TNR LENGTH Inf.

56/32 BIT 56

XMTR LINES 0 0 0 0 0 0 0 0 0 0
1 2 3 4 5 6 7 8 9 10

Message Simulator Program

Figure 1.2.1.1-4

TEST 1.2.4.1

1. Title

   LF/DAC Power Supply Functional Test

2. Objectives

   To determine that DAC power supplies are producing in tolerance DC output voltage, ripple voltage is within specification, and on-off sequencing is correct.

3. Description

   3.1 Connect the equipment per Figure 1.2.4.1-1.

   3.2 Apply +28 VDC at input to LF/DAC racks.

   3.3 Turn on DAC racks 402 & 401 in sequence.

   3.4 Install Drawer MGE Connector breakout box on J2 on front of power supply located at 402/A7.

   3.5 Measure DC voltages and ripple voltage at each of the following points, verify that correct signals are obtained.

(Monitor Points)	(Signal)
J2-A to J2-B (Gnd)	+27.5 to +30.0 VDC
J2-C to J2-G (Gnd)	-5.82 to -6.18 VDC
J2-D to J2-G (Gnd)	-5.82 to -6.18 VDC
J2-F to J2-G (Gnd)	-17.46 to -18.54 VDC
J2-E to J2-G (Gnd)	-17.46 to -18.54 VDC
J2-J to J2-G (Gnd)	-8.5 to -9.5 VDC
J2-H to J2-G (Gnd)	+5.82 to +6.18 VDC
J2-K to J2-G (Gnd)	+28 VDC Isolation Converter

   Measure voltage, current and ripple at the input of the Rack.

3.6 Turn off power supplies.

3.7 Connect the above test points to the Instrumentation System as shown on Table 1.2.4.1-1.

3.8 Turn on power supply for 10 seconds and then turn off; use fast recording speed.

3.9 Perform steps 3.4 through 3.8 for power supply located on Rack 401/A7.

4. Equipment in Test

4.1 Data Analysis Central - AN/GYK-2

4.2 S&M Signal Simulator 25-25085-1

5. Test Equipment Required

5.1 Oscilloscope - Tektronix 545

5.2 Voltmeter - Fluke 801

5.3 NRA Instrumentation System

6. Data Requirements

6.1 All measurements are to be recorded in Test Log for NRA-I functional test. Record tapes at 60 ips and play back at 7.5 ips onto the oscillograph.

TABLE No. 1.2.4.1-1

Tape Channel No.	Gain	DC/AC	Signal Monitor Point [1]	Signal Characteristics	Osc. Scale V/In.
1	1.0	DC	Power Supply J2-G	Output Common (0 V)	2.0
2	0.25	DC	J2-C	-6 V #1	5.0
3	0.25	DC	J2-D	-6 V #2	5.0
4	0.167	DC	J2-E	-18 V #1	10.0
5	0.167	DC	J2-F	-18 V #2	10.0
6	1.0	DC	J2-B	+28 V Return (0 V)	2.2
7	0.25	DC	J2-H	+6 V	5.0
8	0.25	DC	J2-J	-9 V	5.0
9	0.167	DC	J2-M	+28 V (4 amp)	10.0
10	0.167	DC	J2-N	+28 V (2 amp)	10.0
11					
12	1.0	AC	Audio Osc.	1000 cps 2 V p-p reference	2.0
13	1.0	AC		Time Code 100 pps	1.0
14				Voice	

[1] All points referenced to instrumentation ground.

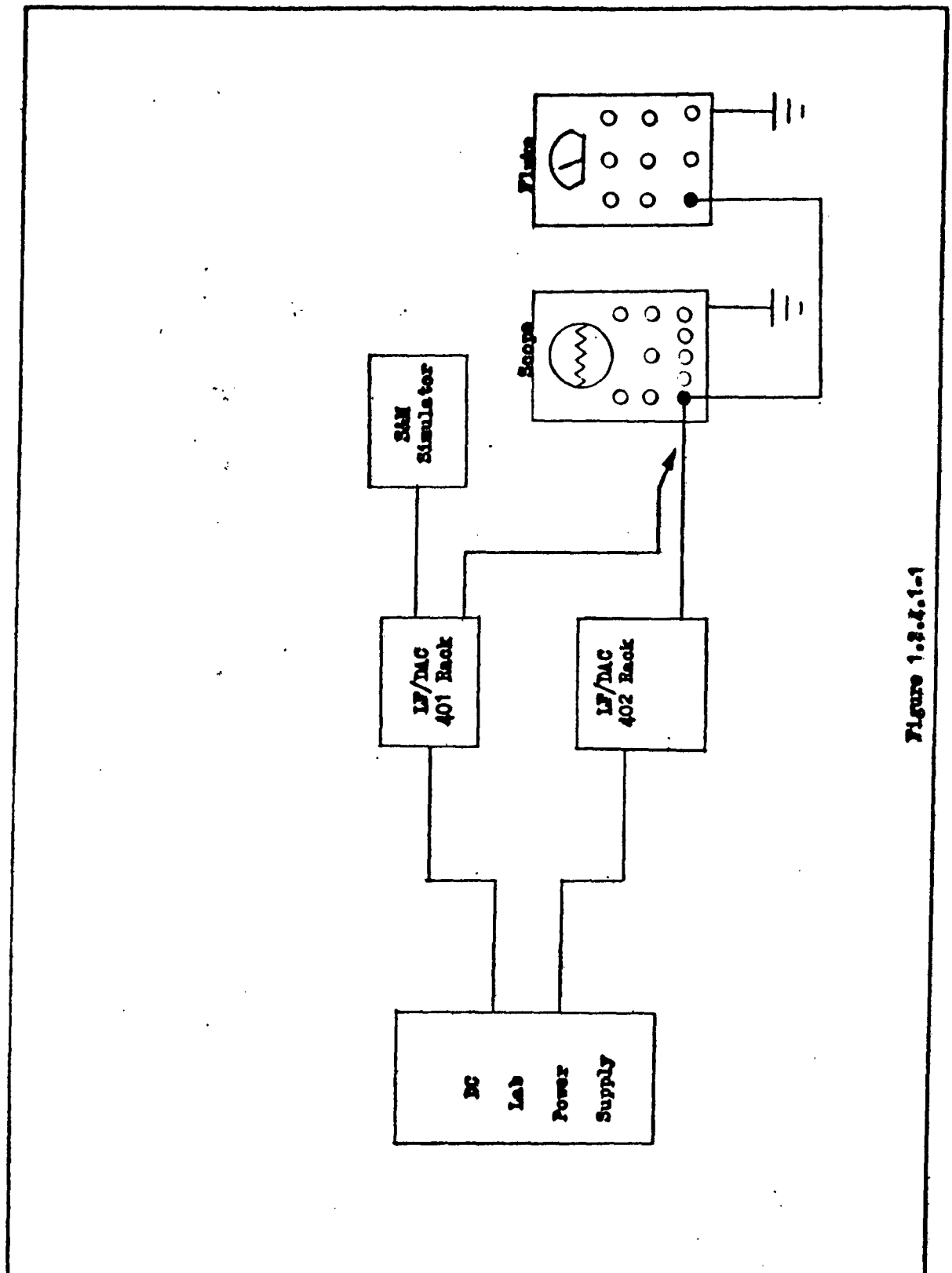


Figure 1.2.4.1-1

TEST 1.2.4.2

1. Title

Functional Test of LF/DDG Command Receive Channels

2. Objectives

To adjust gain of amplifiers.

To verify the proper bandwidth and frequency response.

3. Description

3.1 Connect the equipment per Figures 1.2.4.2-1 and 1.3.1.1-2.

3.2 Install Cable Breakout boxes on J10 and J4 on top of LF/DDG; do not reconnect removed cables.

3.3 Connect a 600 ± 30 ohm output impedance audio oscillator to J10 cable breakout points as listed in Table 1.2.4.2-1; also connect VTVM and one channel of an oscilloscope across resistor.

3.4 Connect a 600 ± 30 ohm resistor across the J4 cable points as listed in Table 1.2.4.2-1; connect remaining channel of oscilloscope and VTVM across the resistor.

3.5 Assure that repeat coil is adjusted for 470/600 #19 AWG impedance ratio (Strap B on TB1 through TB6).

3.6 Assure equalizer resistance is 21 ohms (Straps A, B, D, F and H on TB9 through TB14); this adjustment is for 22-24 miles of #19 AWG cable.

3.7 Adjust gain to obtain the values shown on Table 1.2.4.2-1 for 1000 cps. Perform the remaining indicated steps on Table 1.2.4.2-1 and make the noted observations.

4. Equipment in Test

4.1 LF Data Analysis Central AN/GYK-2

5. Test Equipment Required

5.1 Audio Oscillator - Hewlett-Packard 200CD

5.2 VTVM - Hewlett-Packard

5.3 True RMS Voltmeter - Ballentine 320A

5.4 Electronic Counter - Berkeley 554B

5.5 Oscilloscope - Tektronix 555

6. Data Requirements

Record all data in Test Log.

7. Reference

D2-12004 Model Specification, Data Analysis Central AN/GYK-2

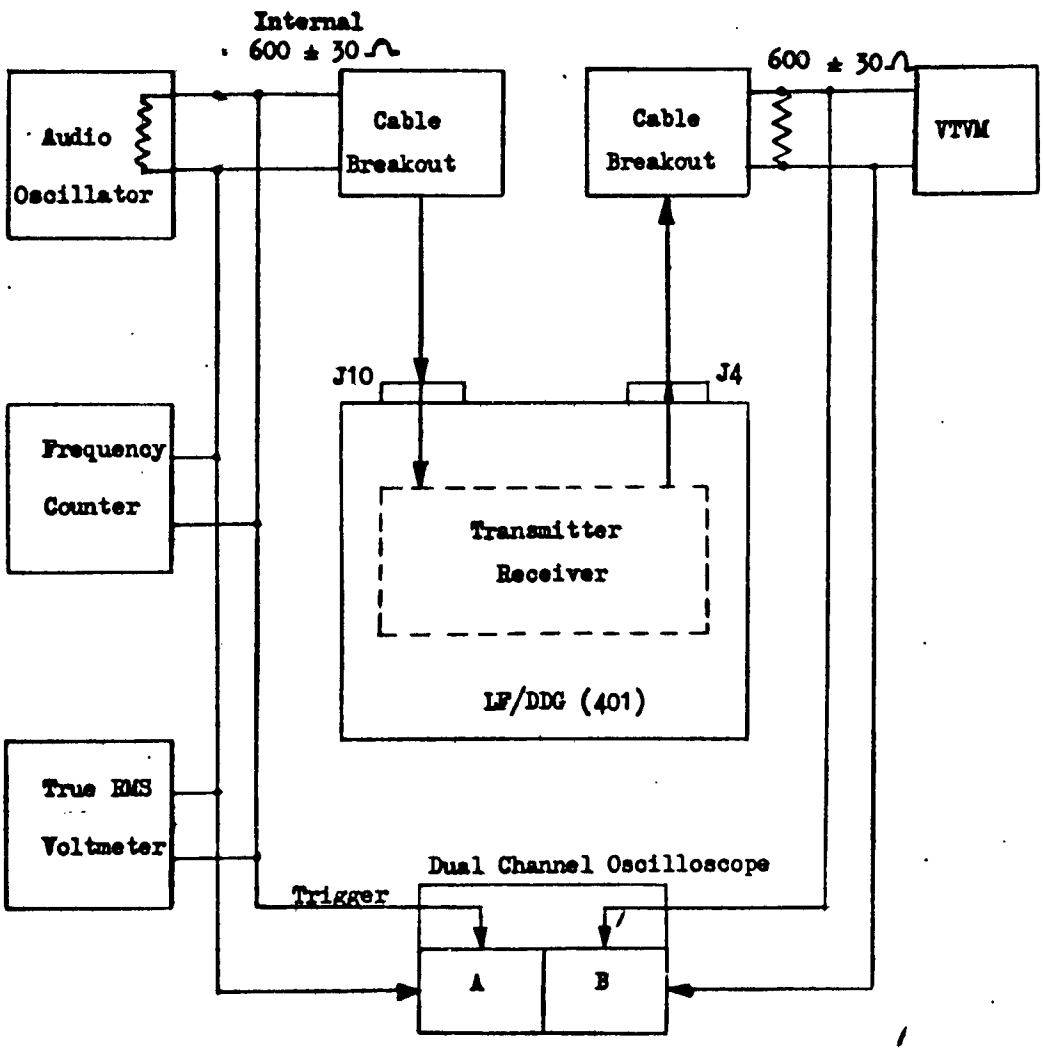
Test Conditions					Test Monitor Points		
Test Number	Line	Input Point	Input Frequency	Input Voltage (volts rms)	Output Point	Output dbm	
1	1	J10-2, -3	1000	.010	J4-2, -3	3 ± 1 dbm	1
			200	.011 to.019			
			300	.010 to.018			
			500	.009 to.017			
			700	.008 to.015			
			1400	.006 to.011			
			2100	.005 to.010			
	1	J10-2, -3	3100	.005 to.009	J4-2, -3		
2	2	J10-4, -5	2	3	J4-4, -5		
3	3	J10-6, -7	2	3	J4-6, -7		
4	4	J10-8, -9	2	3	J4-8, -9		
5	5	J10-10, -11	2	3	J4-10,-11		
6	6	J10-12, -13	2	3	J4-12,-13	3 ± 1 dbm	

1 Adjust gain at 1000 cps.

2 Input frequencies are the same as Test 1.

3 Input voltages are the same as Test 1.

Table 1.2.4.2-1



Configuration for Test of Command Receive Channels

Figure 1.2.4.2-1

TEST 1.2.4.3

1. Title

Functional Test of LF/DDG, Command and Status Transmit Channels

2. Objectives

To verify that transformer attenuation is not excessive.

To verify that frequency response is in tolerance.

3. Description

3.1 Connect the equipment per Figure 1.2.4.3-1 and 1.3.1.1.-2.

3.2 Install a Cable Breakout Box on J3 and J5 of LF/DDG rack.

Do not connect removed cables.

3.3 Connect a 470 ± 24 ohm resistor to the output connections located on J3 Cable Breakout as listed in Table 1.2.4.3-1. Also, connect voltmeter and frequency counter to resistor.

3.4 Connect a 600 ± 30 ohm output impedance audio oscillator to J5 Cable Breakout points as listed in Table 1.2.4.3-1.

3.5 Assure that transformers in Receiver-Transmitter drawer are adjusted for 470 ohm output impedance (lead attached to transformer terminal 6, #19 AWG).

3.6 Perform the operations noted on Table 1.2.4.3-1 and observe the indications.

4. Equipment in Test

4.1 LF/Data Analysis AN/GYK-2

5. Test Equipment Required

5.1 Audio Oscillator - Hewlett-Packard 200CD

5.2 VTVM - Hewlett-Packard

5.3 Frequency Counter - Berkeley 554B

6. Data Requirements

Record all data in Test Log.

Test Conditions					Test Monitor Points		
Test Number	Line	Input Point	Input Freq.	Input Voltage	Output Point	Output Voltage (across 470Ω)	
1	1	J5-2, -3	1000	4 dbm	J3-2,-3	4±1 dbm	Add 1.06 dbm to output reading when measuring across 470 ohm load.
			200			± 1 dbm of reference 1000 cps input	
			300				
			500				
			700				
			1400			± 1 dbm of reference 1000 cps input	
			2100				
	1	J5-2,-3	3100	4 dbm	J3-2,-3		
2	2	J5-4,-5	Repeat above	Repeat above	J3-4,-5	Repeat above	
3	3	J5-6,-7			J3-6,-7		
4	4	J5-8,-9			J3-8,-9		
5	5	J5-10,-11			J3-10,-11		
6	6	J5-12,-13			J3-12,-13		
7	Status	J2-49,-51	Repeat above	Repeat above	J2-8,-21	Repeat above	J2 of Receiver-Transmitter Digital Data Drawer.

Table 1.2.4.3-1

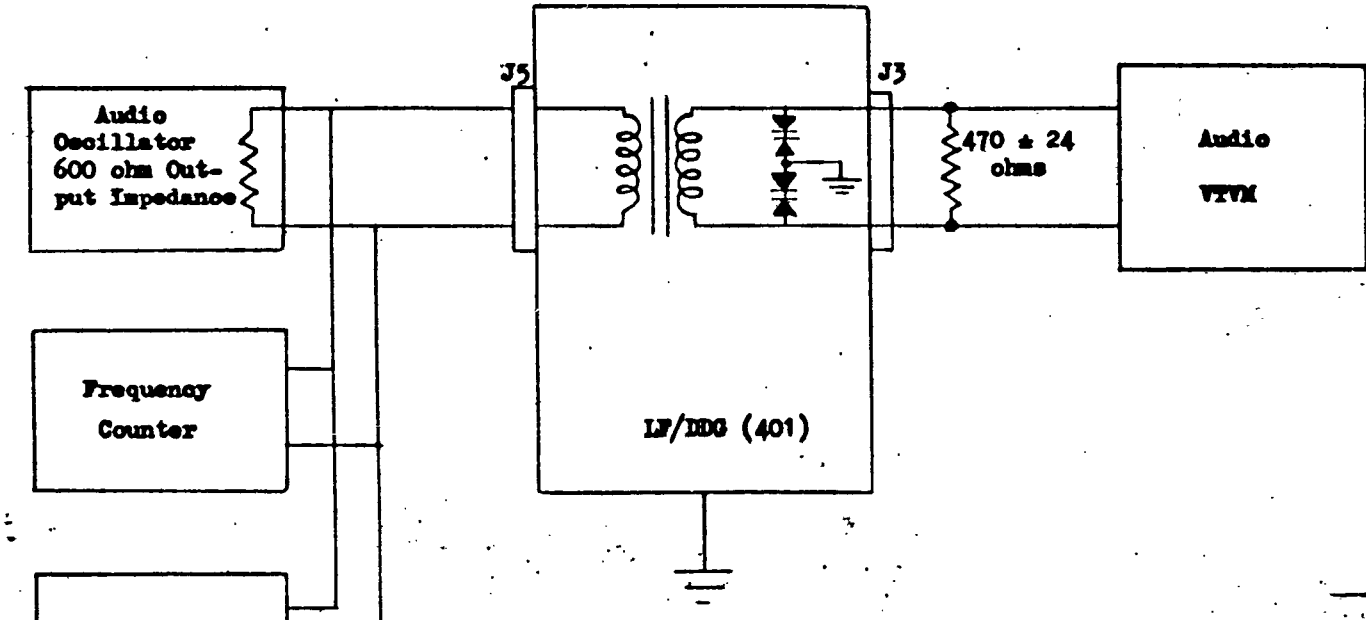


Figure 1.2.4.3-1

TEST 1.2.4.4

1. Title

   LF/DAC Valid Message Retransmission

2. Objectives

   To verify that no invalid messages will be transmitted.

3. Description

   3.1 Connect the equipment per Figures 1.3.1.1-1 and 1.2.4.4-1.

   3.2 Program the Message Simulator per Figure 1.2.4.4-2. The Simulator will generate command messages on LF Receive Line No. 1 and all-mark messages on Receive lines 2 through 6.

   3.3 Monitor the LF Command Transmit output at Patch panel jack F2X1. Verify that retransmission occurs for valid messages.

   3.4 Insert the Ripple Error tape into the Message Simulator. Start the tape and monitor the oscilloscope to verify that no retransmission occurs for the duration of the program. The tape will stop at the end of the program.

   3.5 The valid message level may be monitored at 403A3J1-GG. The signal will be 0 volts for a valid message.

   3.6 The above test should be repeated for each LCF address by changing the Message Simulator program per Figure 1.3.1.1-3.

   3.7 Repeat the test for an Inhibit Message with bits 8 through 56 inverted by inverting one bit at a time.

4. Equipment in Test

4.1 LF Data Analysis Central AN/GYK-2

4.2 Patch Panel and Cable Simulators 25-29327

4.3 Message Simulator, Digital Data 25-29584-1

4.4 S&M Signal Simulator 25-25085-1

5. Test Equipment Required

5.1 Oscilloscope, Tektronix 545A or 555 with Type CA Preamps

5.2 Ripple Error Tape for Message Simulator

6. Data Requirements

Record all data and observations in the Test Log.

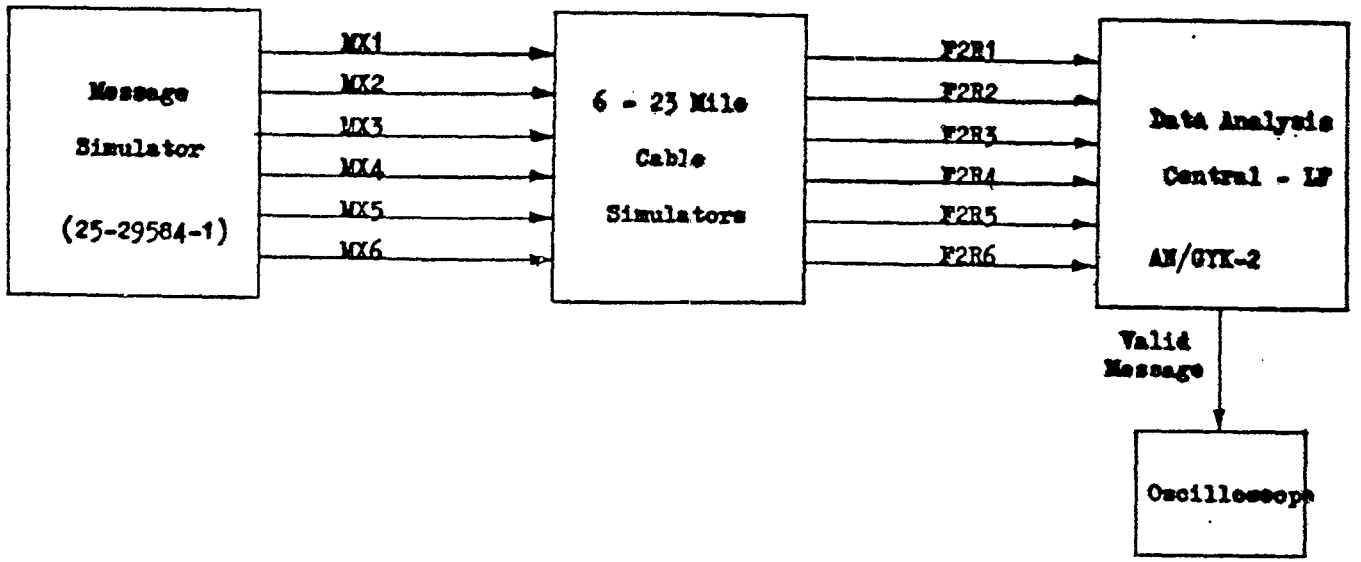
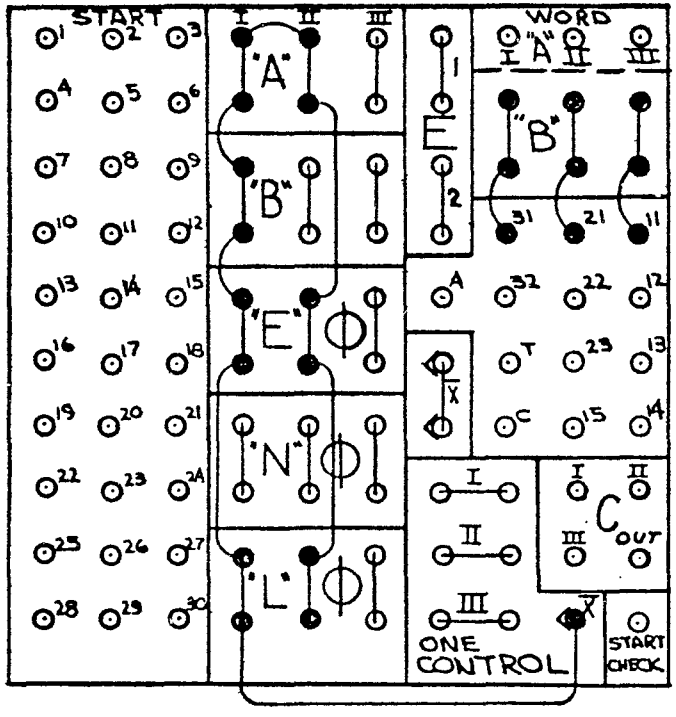
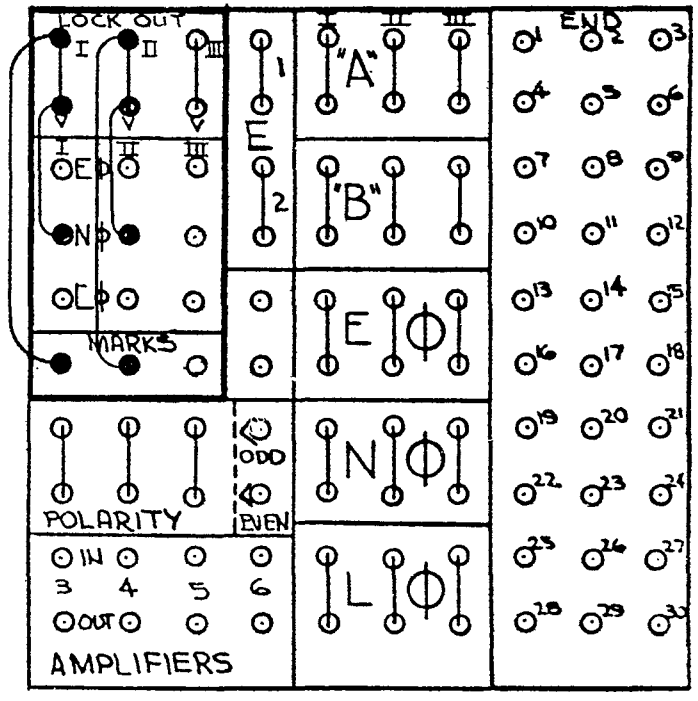


Figure 1.2.4.4-1





Control Panel Settings:

2X TNR Up
EXTR. XMTR Up
CONT. Up
N ∅ Aux.
L ∅ Aux.

ERROR STOP Off
ERROR DISPLAY 0 0
OPERATION Auto
TRANSLATOR Auto

Code Panel Settings:

XMTR LENGTH 20
TNR LENGTH 20
56/32 BIT 56
XMTR LINES 0 ● ● ● ● ● 0 0 0 0
1 2 3 4 5 6 7 8 9 10

Message Simulator Program Patch Board

Figure 1.2.4.4-2

TEST 1.2.4.15

1. Title

LF/DAC Functional Test of Loss of Transmit Tone and Critical Error Circuitry.

2. Objectives

2.1 To verify Loss of Transmit Tone is detected.

2.2 To verify that a Critical Error will be detected and Inhibit Fire Code read out.

3. Description

3.1 Connect the equipment per Figure 1.3.1.1-2.

3.2 Connect the Message Simulator patchboard outputs MX_1 through MX_6 to inputs of a 23 mile Cable Simulator.

3.3 Connect output of Cable Simulator to patchboard inputs L_1R_1 through L_1R_6.

3.4 Program the Message Simulator to transmit "1's" on all lines.

3.5 Provide a True Strategic Alert condition.

3.6 Provide the test conditions as shown in Table 1.2.4.15-1 and observe the noted indications.

3.7 Perform steps in Table 1.2.4.15-2.

CAUTION: Do not short incorrect pins to common, or damage may occur.

3.8 Place a -6 volts on J1-p of the Launch Enable drawer from 401A7J2-C.

3.9 (Test Point) Connect an oscilloscope to 401A6J1-S and monitor for Fire Code output.

3.10 (Visual Indication) Verify that the Strategic Alert Status bit is a zero and the Fault bit is a mark at F2ST.

3.11 Send an LCF #1 Launch message.

3.12 The Launch Commanded, and Launch in Process status bits shall be marks at F2ST.

3.13 Send an LCF #2 Launch message.

3.14 (Visual Indication) Note that no Fire Code output results at 401A651-S.

3.15 Remove signal at A5J1-p.

3.16 Reset the LF/DAC.

3.17 Repeat steps 3.11, 3.13 and verify Fire Code readout at A6J1-S.

4. Equipment in Test

4.1 LF and Data Analysis Center AN/GYK-2

4.2 S&M Simulator 25-25085-1

4.3 Message Simulator 25-29584-1

5. Test Equipment Required

Oscilloscope - Tektronix 545

6. Data Requirements

Record all data in the Test Log.

7. References

RCA Logic Dwg. #8323671 Rev. J (5/10/62)

Test Condition		Visual Indications			
Test Number	Test Point Grounded	Status Indication	Status Bit True	Status Diphase	S&M Indication (VRSA)
	1			2	
1	J1-s	Alarm	4, 9		Converter
2	J1-t	Alarm	4, 9		Waveform
3	J1-u	Alarm	4, 9		
4	J1-v	Alarm	4, 9		
5	J1-w	Alarm	4, 9		
6	J1-x	Alarm	4, 9		
7	None		9		

1 Test point is located on J1 connector of 402/A4 Converter Waveform drawer CV-1254.

2 F_2S_1 on patchboard can be monitored with an oscilloscope; trigger can be obtained from J1-M on 401/A6 (Inject pulse).

Table 1.2.4.15-1

Step	Function	Connect A7J1-G to	Then A7J1-G to
1	One Net Launch A • $\overline{\text{One Launch A}}$	A5J1-V	
2	One Net Launch B • $\overline{\text{One Launch A}}$	A5J1-f	
3	End of Launch Plan • $\overline{\text{One Launch Vote}}$	A5J1-W	
4	End of Timer • $\overline{\text{One Launch Vote}}$	A5J1-S	
5	Two Votes - $\overline{\text{One Launch A}}$	A5J1-EE	
6	Shift Fire Code - $\overline{\text{One Launch A}}$	A5J1-FF	
7	MD Reset - $\overline{\text{One Launch A}}$	A5J1-U	
8	$\overline{\text{One Net Launch B}}$	A5J1-B	
9	One A•$\overline{\text{Enable Ctr.}}$ • $\overline{\text{Two}}$•$\overline{\text{EOT}}$	A5J1-C	
10	$\overline{\text{MD Reset}}$	A5J1-T	
11	One Launch Vote	A5J1-n	
12	Two Simultaneous Launch Votes	A5J1-n	A5J1-m

NOTES:

(1) For each step A5J1-A changes to -6 volts.

(2) Reset between each step and verify that A5J1-A changes to 0 volts.

Table 1.2.4.15-2

TEST 1.2.4.19

1. Title

   LF/DAC MD Reset Pulse Generation

2. Objectives

   To determine if MD Reset pulses are generated consistently when the second Launch Command is received at the LF.

3. Description

   3.1 Connect the equipment per Figure 1.3.2.1-1.

   3.2 Connect the Message Simulator MX_1 output to the input of a 20 mile #19 AWG Cable Simulator.

   3.3 Connect the output of the Cable Simulator to the F_2R_1 patch panel input.

   3.4 Program the Message Simulator to generate a Launch LCF #1 (Mode B) and Launch LCF #2 (Mode A) message in sequence. Vary the time between messages.

   3.5 Connect one channel of a Dual channel oscilloscope to 401A5J1-U on the Launch Enable Unit.

   3.6 Connect one channel of a dual channel oscilloscope to 401A5J1-G on the Launch Enable Unit.

   3.7 Connect the oscilloscope common to 401A7J2-G.

   3.8 Trigger both sweeps from A5J1-G.

   3.9 (Visual Indication)

   A 100 ms, -6 volt pulse should appear at A5J1-G when the second Launch is registered.

3.10 Reset the SCM equipment after each launch sequence and repeat the launch sequence to determine if a correct MD reset pulse is generated whether J1-U is 0 or -6 volts when the MD Reset pulse starts.

4. Equipment in Test

4.1 LF/Data Analysis Central -- AN/GYK-2

4.2 Message Simulator 25-29584-1

4.3 Cable Simulator and Patch Panel 25-29327-1.

5. Test Equipment Required

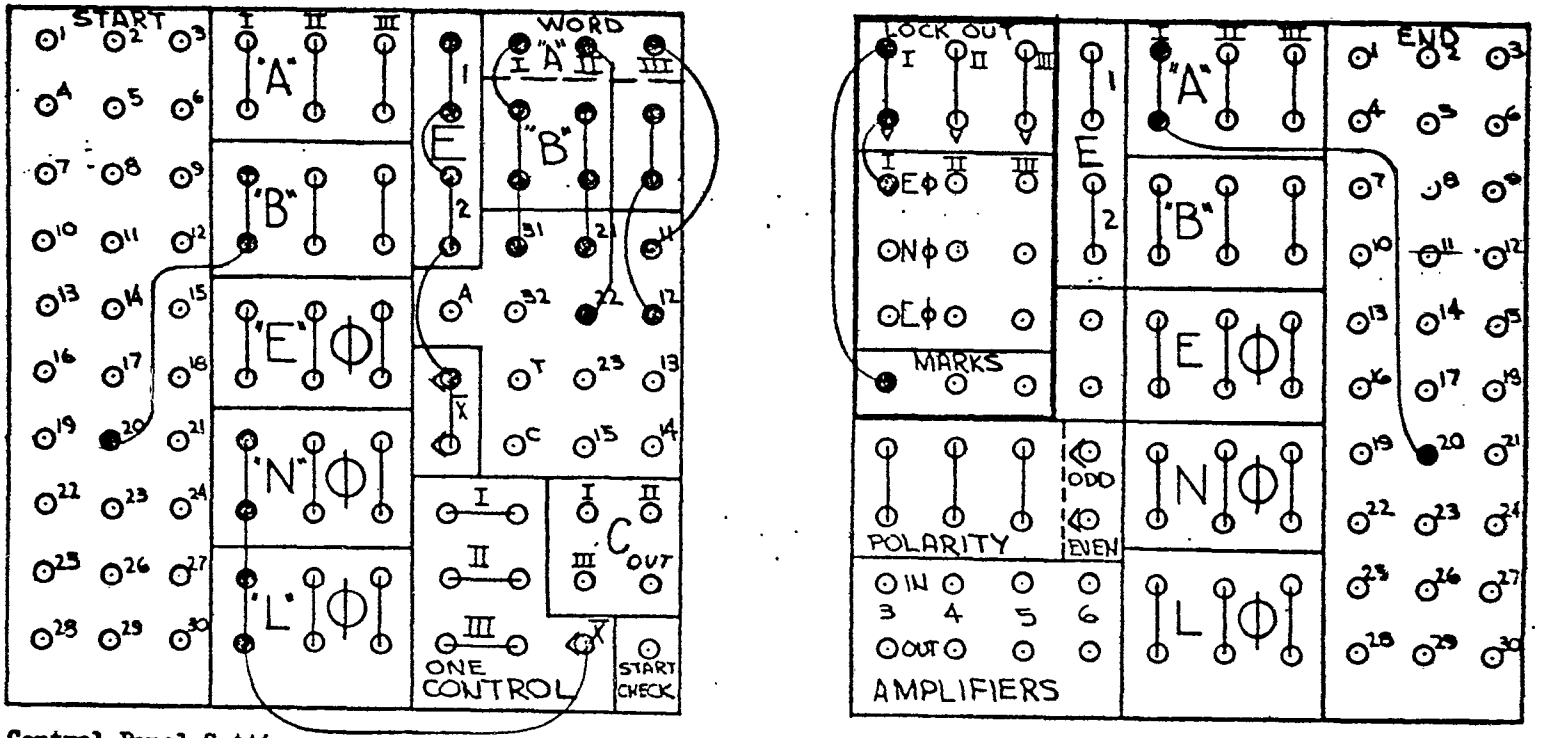
5.1 Dual Channel Oscilloscope -- Tektronix 555

5.2 Oscilloscope Camera

6. Data Required

6.1 Record all data in the Test Log.

6.2 Photograph observed waveforms.



Control Panel Settings:

2X TNR	Up	ERROR STOP	Off
EXT. XMTR	Up	ERROR DISPLAY	0 0
CONT.	Up	OPERATION	Set XMTR
N Ø	Aux.	TRANSLATOR	Aux.
L Ø	Aux.		

Code Panel Settings:

XMTR LENGTH 30 TNR LENGTH Inf.

56/32 BIT 56

XMTR LINES 0 0 0 0 0 0 0 0 0 0
1 2 3 4 5 6 7 8 9 10

Message Simulator Program

Figure 1.2.4.19-1

TEST 1.2.5.2

1. Title

SCN Equipment Integration with the LF/SCN Interface Simulator, ACO 101.

2. Objectives

To verify functional compatibility of the SCN equipment and ACO 101.

3. Description

3.1 Connect the equipment per Figure 1.2.5.2-1.

3.2 Place the ACO 101 Master Control switch to LCF CONTROL and turn on power.

3.3 Turn on power to the SCN Equipment and LCC.

3.4 Place the ACO 101 Master Control switch to MANUAL.

3.5 Initiate a Calibrate Command from the LCC and verify that the Calibrate Command Delivered lamp illuminates at the ACO 101.

3.6 Initiate a Test Command from the LCC and verify that the Test Command Received lamp illuminates at the ACO 101.

3.7 Initiate a SCNT-S&M from the LCC and verify that the SCNT-S&M lamp illuminates at the ACO 101.

3.8 Activate the Decoder Enabled switch to the ON position at the ACO 101.

3.9 Initiate a launch vote from the LCC and the Message Generator and verify that the Launch Command Received lamp illuminates at the ACO 101.

3.10 Initiate the following status conditions at the ACO 101 and verify that the correct status lamp illuminates at the LCC.

Strategic Alert

Test in Process

Calibrate in Process

No-Go

Alarm

Warhead Alarm

Launch in Process

Inner Security Violated

Outer Security Violated

3.11 Simulate SCN Faults per Table 1.2.5.2-1 and verify that the proper Fault indicator illuminates at the ACO 101 and the LCC. Reset the SCN after Fault removal and verify that the Fault lamps are out.

3.12 Test Complete

4. Equipment in Test

4.1 ACO 101

4.2 SCN Equipment

4.3 LCC

4.4 Message Generator

4.5 ACO 107

5. Test Equipment Required

None

6. Data Requirements

6.1 Record all data in the Test Log.

TABLE 1.2.5.2-1

Fault	Method of Obtaining Fault
LEU Fault	Connect 401A5J1-S to ground at 401A7J2-G.
MRU Fault	Connect 402A4J1-g to ground at CV1254.
LSU Fault	Connect 402A3J1-T to ground at CT22.
Line Monitor Fault	Remove tone at F2R1 from Receive Line No. 1.
Net Traffic Fault	Send an invalid message to the LF (reference Figure 1.3.1.1-3).
MDU Fault	Remove the decoder drawer.

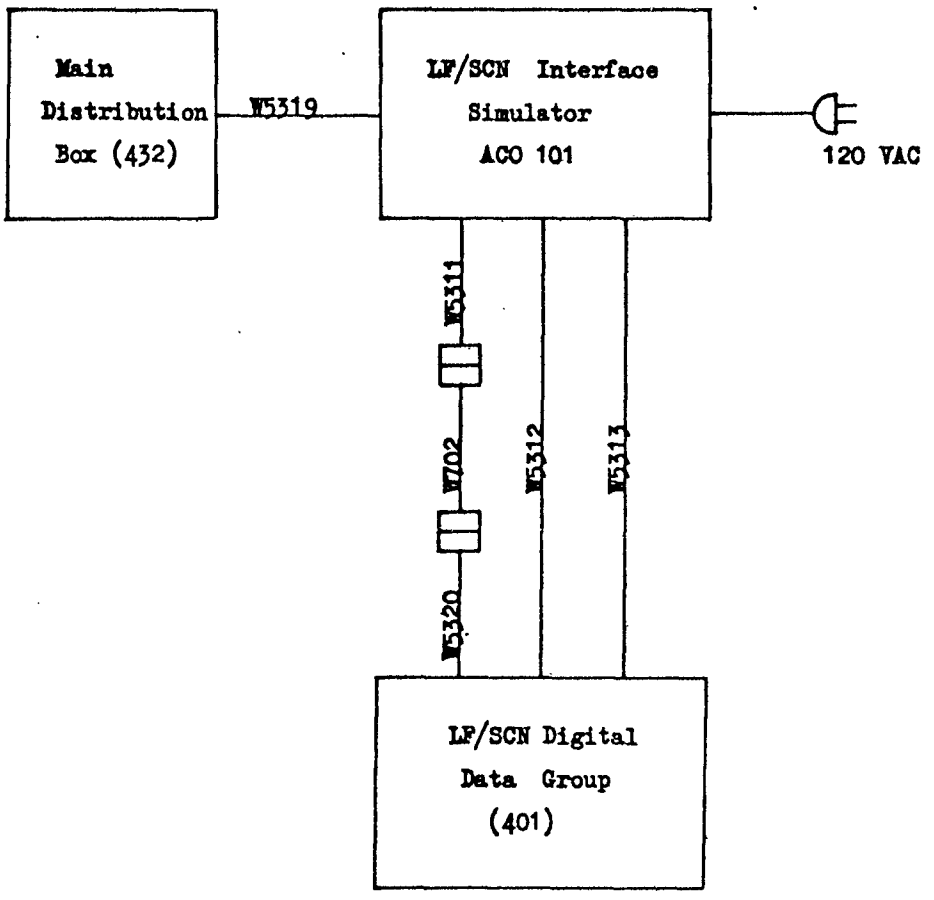


Figure 1.2.5.2-1

TEST 1.2.6.1

1. Title

Verification of Line Equalizer Adjustments for Simulated Malmstrom EWO Circuits.

2. Objectives

2.1 To verify that the equalizer settings given for the non-loaded EWO lines at Malmstrom will give an essentially flat frequency response.

3. Test Description

3.1 Connect the equipment as shown in Figure 1.2.6.1-1. Use channels one and two of drawer D in the loaded cable simulator.

3.2 Apply a 1000 cps + 3 dbm signal to the input of 37 miles of #19 AWG NL cable.

3.3 Adjust gain of A12 to give -10 dbm at the output of channel 1.

3.4 Connect the output of channel 1 to the input of channel 2.

3.5 Connect shunts across equalizer #2 to remove it from line.

3.6 Adjust gain of A10 to give + 3 dbm at the output of channel #2.

3.7 Vary frequency of input signal from 200 to 3000 cps, keeping a constant input level of + 3 dbm.

3.8 Observe and record frequency response at the output of channel #2.

3.9 Re-patch cable simulator to include 7 miles of crosstalk simulation at the near end of the 37 miles of #19 AWG NL cable.

3.10 Apply a recorded voice message to the simulator line. Use an average level of approximately + 3 dbm.

3.11 Apply a 3000 cps square wave at + 15 dbm to an adjacent channel in the crosstalk simulator.

3.12 Using a set of headphones at the output of channel #2, verify that the voice message is intelligible.

3.13 Apply white noise to the line at the far end. Use a signal level of approximately + 3 dbm.

3.14 Using the headphones, again verify that the voice message is intelligible.

3.15 Restrap repeat coils T10 and T5 for #16 AWG NL cable. Strap 35 - 36 and 1 - 2 on TB 18 and TB21.

3.16 Repeat steps 2 through 14 for 40 and 47 miles of #16 AWG N1. For #16 AWG cable one stage of amplification will be used. Adjust gain at A12 for + 3 dbm out of channel #1 (CH10T).

4. Equipment in Test

4.1 SAC/CTE Repeater Telephone Drawer TA-493/GTC P/N 8324411-501 S/N 08-1

4.2 Non-loaded Equalizer

5. Test Equipment Required

5.1 Oscillator - HP 207A

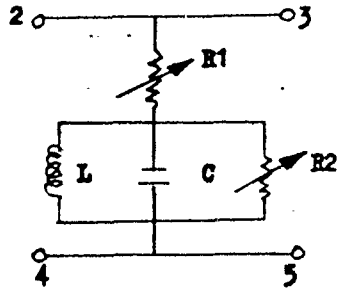
5.2 Square wave generator - Precision Instruments

5.3 Noise generator - General Radio 1390B

5.4 VTVM (2) - HP 400H

5.5 Decade resistance boxes (2)

Cable size & length	R_1	R_2	C	L
37 mi. #19	1.5 ohm	Inf.	0.268 mfd	6 mh
40 mi. #16	4.0 ohm	1000 ohm	0.268 mfd	6 mh
47 mi. #16	0.5 ohm	1950 ohm	0.268 mfd	6 mh



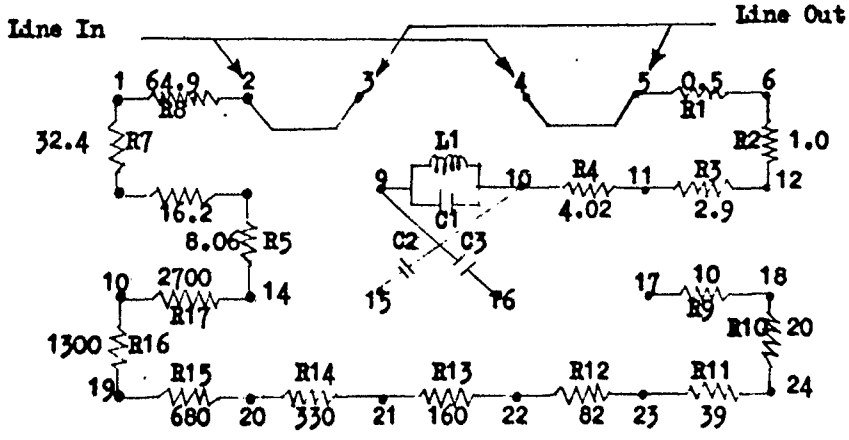


Table 1.2.6.1-1

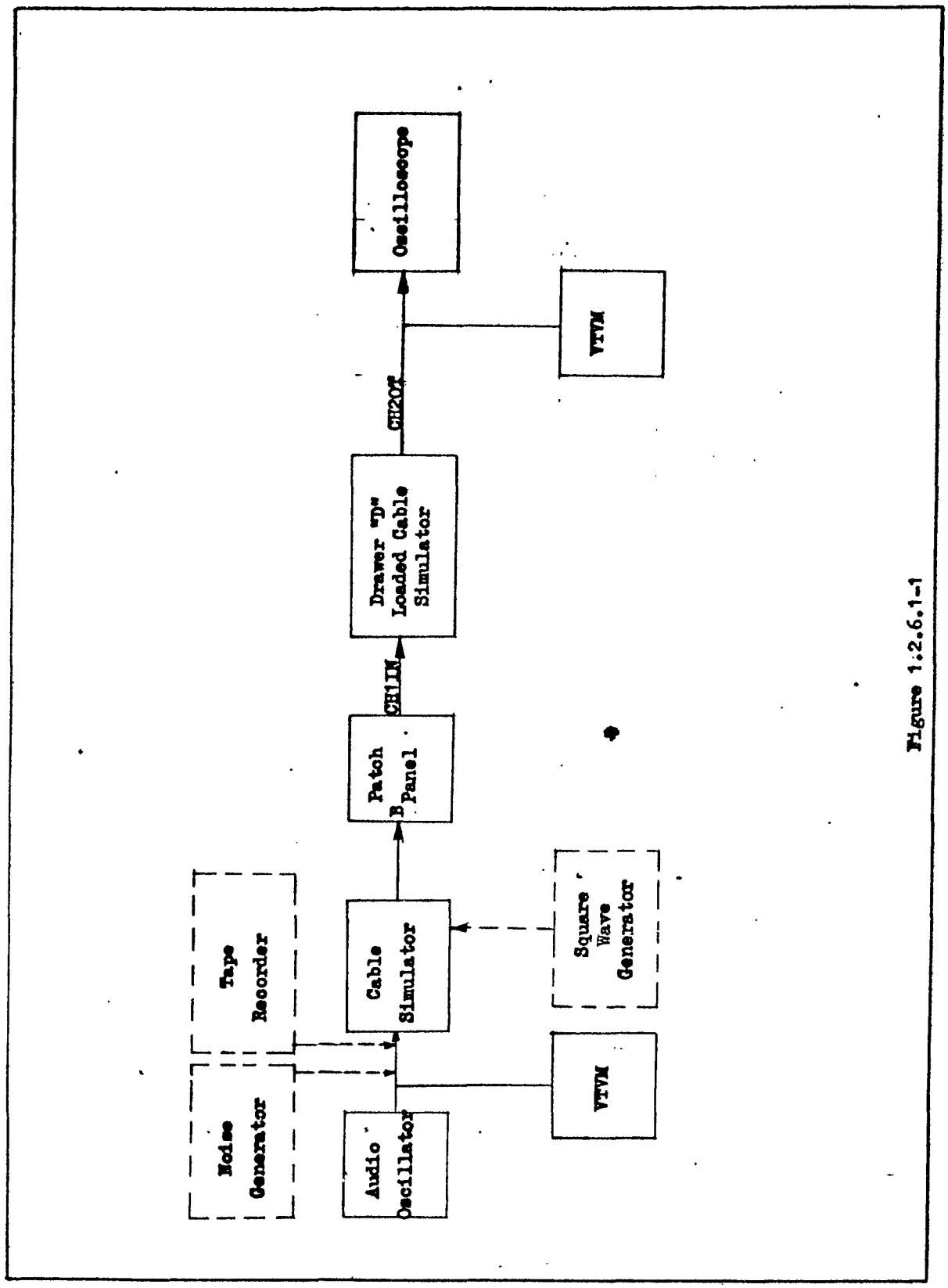


Figure 1.2.6.1-1

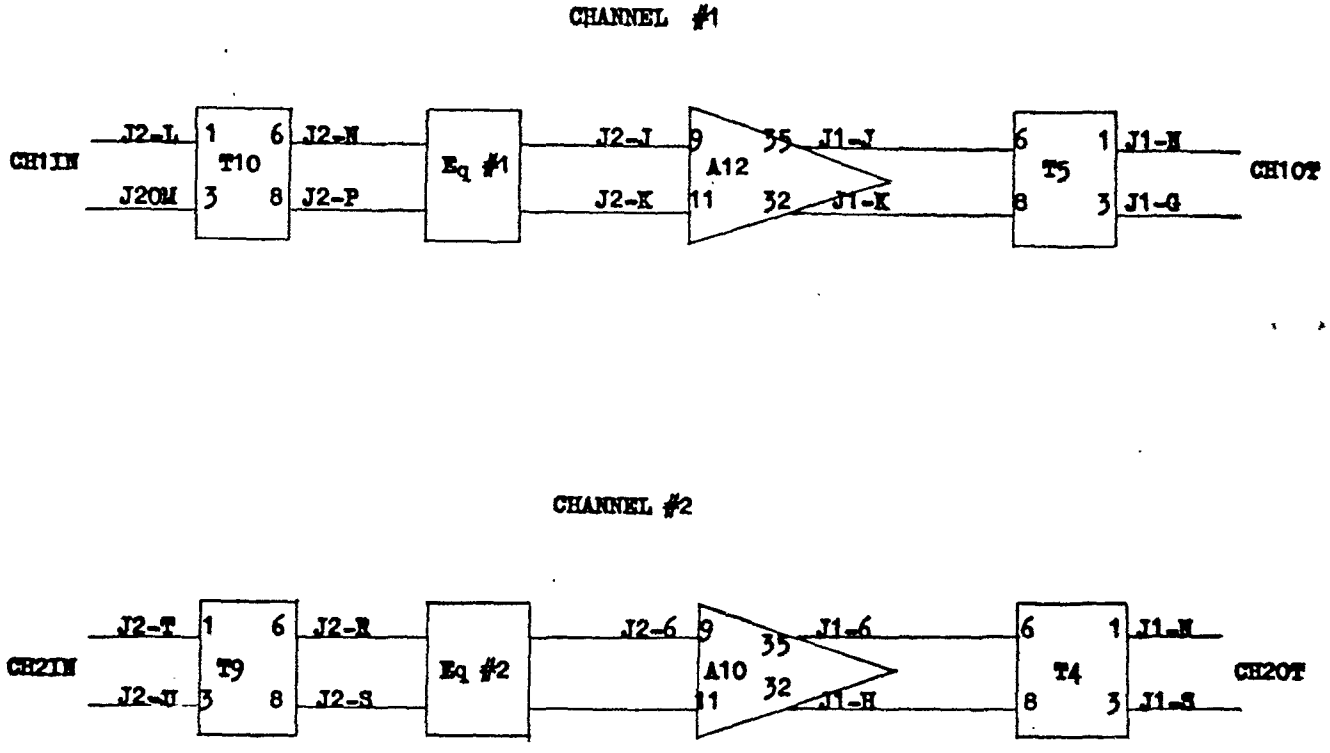


Figure 1.2.6.1-2

TEST 1.2.7.1

1. Title

PAS Monitor Panel Assembly Load Requirements Test.

2. Objectives

2.1 To determine the load requirements of the PAS Monitor Panel Assembly, ITT Kellogg P/N 820200 G-1 as modified for STP III WG15.2 tests.

2.2 To determine the signal output of the PAS Monitor Panel.

3. Test Description

3.1 Disconnect leads from the L1 terminal 1, 2, 7, 8, 16 and 17 in the simulated top hat.

3.2 Supply +24 VDC ± 0.5 VDC power to L1-2 (+24) and L1-1 (return) from a separate power supply.

3.3 Connect a 0 - 50 VDC Voltmeter in parallel with the power supply across L1-1 and L1-2.

3.4 Connect a 0 - 300 ma DC ammeter in series with the power supply and PAS (in lead L1-2).

3.5 Apply the noise signal from the PAS tape recording used in WG15.2 directly to L1, 7 and 8, at a level of -20 ± 2 dbm.

3.6 Turn ON the power supply.

3.7 Vary the volume control on the NAFH speaker of the PAS Panel from the minimum to a nominal setting and to the maximum volume setting. Monitor the input voltage and current drain.

3.8 Measure the output sound level for each volume setting at the LCC operation position and at a distance of 15 ± 1 feet from the Panel.

3.9 Verify that the signal is intelligible at both positions.

4. Equipment in Test

PAS Monitor Panel Assembly, ITT Kellogg P/N 820200 G-1 as modified by STP III WG15.2 tests.

5. Test Equipment Required

5.1 0 - 50 VDC Voltmeter

5.2 0 - 300 M2 DC Ammeter

5.3 General Radio Sound Level Meter Type 1551-B.

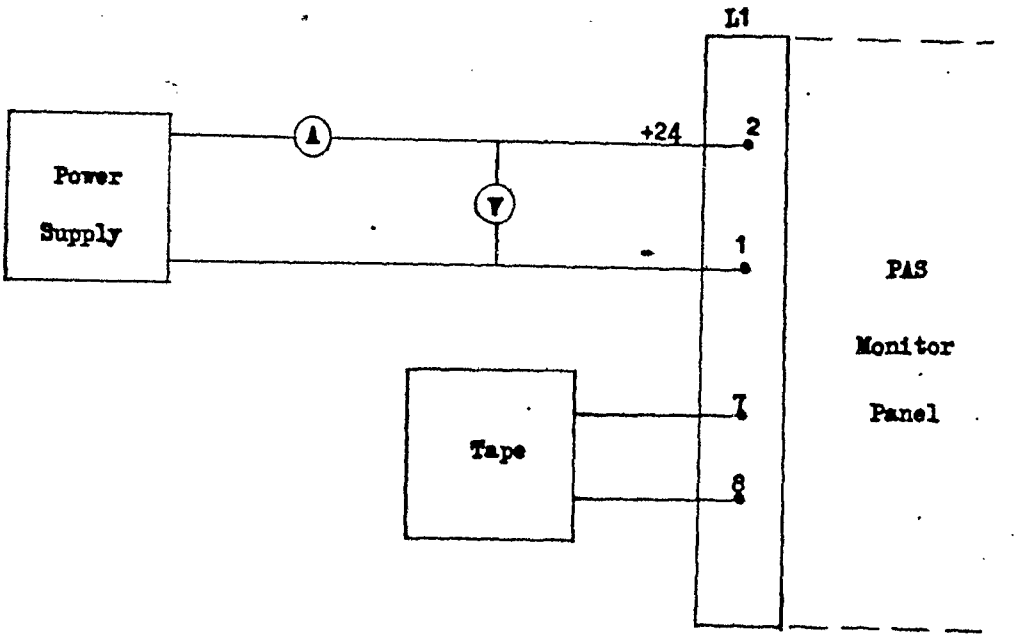


Figure 1.2.7.1-1

TEST 1.3.1.1

1. Title

LCC, LCF, LF, Message Simulator and S&M Simulator Single Thread

2. Objective

2.1 To verify the functional compatibility of the LCC, LF, LCF, Message Simulator and S&M Simulator.

3. Description

3.1 Connect equipment per Figures 1.3.1.1-1 and 1.3.1.1-2.

3.2 Connect Message Simulator outputs to LF Receive Lines F2R2 through F2R6.

3.3 Connect:

(a) LCF Transmit C2X1 to LF Receive F2R1.

(b) LCF Receive C2R1 to LF Transmit F2X1.

(c) LCF Status Receive C2S1 to LF Status F2ST.

3.4 Program Message Simulator to generate bursts of 20 Test Launch Messages alternating with marks for 20 message lengths. Use Test Launch Message formats of LCF #2, #3, #4 or #5 on Figure 1.3.1.1-3.

3.5 Perform steps 1 through 16 of Table 1.3.1.1-1 and make note of the observations.

4. Equipment in Test

4.1 Message Simulator 25-29584

4.2 Launch Control Console 25-24172-11

4.3 S&M Simulator 25-25085

4.4 Patch Panel and Cable Simulator 25-29327

4.5 LF Data Analysis Central AN/GYK-2

4.6 LCF Data Analysis Central AN/GYK-1

5. Test Equipment Required

None

6. Data Requirement

Record observations of the steps in Table 1.3.1.1-1 on M&IR Log.

Step		Observe at LCC												
		Response delay	Strategic Alert	Fault	Standby	Armed	Launch Commanded	Launch in Process	Missile Away	Warhead Alarm	Outer Security Violated	Inner Security Violated	Alarm #1	Alarm #2
1	Reset LF, LCF and S&M Simulator	*	X			X								
2	Send Launch from DD/MS	*	X			X	X	X					X	
3	Send Launch from LCC	3sec.				X	X	X					X	
		23				X	X				X	X	X	X
		30				X	X	X	X		X	X	X	X
		35 sec.		X		X	X				X	X	X	X
4	Reset LF/DAC & SUM Simulator, Security Reset, Missile Away and Audible Alarms	*	X			X								
5	Send Launch from DD/MS	*	X			X	X	X					X	
6	Reset Alarm #1	*	X			X	X	X						
7	Send Inhibit from LCC	*	X			X	X							
		3 min.	X			X								
8	Send Launch from DD/MS	*	X			X	X	X					X	
9	Inhibit from LCC	*	X			X	X						X	
10	Reset Audible Alarm	*	X			X	X							
11	Launch from LCC 60 secs. after Inhibit	*	X			X	X	X					X	
		3 sec.				X	X	X					X	
12	Reset Audible Alarm, S&M Simulator, and LF/DAC	*	X											
13	Send Test from LCC	*	X		X									
		60 sec.	X											

Table 3.3.1.1-1 (Continued next page)

Step		Observe at LCC													
		Response delay	Strategic Alert	Fault	Standby	Armed	Launch Commanded	Launch in Process	Missile Away	Warhead Alarm	Outer Security Violated	Inner Security Violated	Alarm #1	Alarm #2
14	Send Calibrate from LCC	*	X		X									
		60 sec.	X											
15	Send SCNT from LCC	*	X		X			X						
		10 sec.	X											
16	Send SCNT from DD/MS	*	X		X									
		10 sec.	X											

Table 1.3.1.1-1

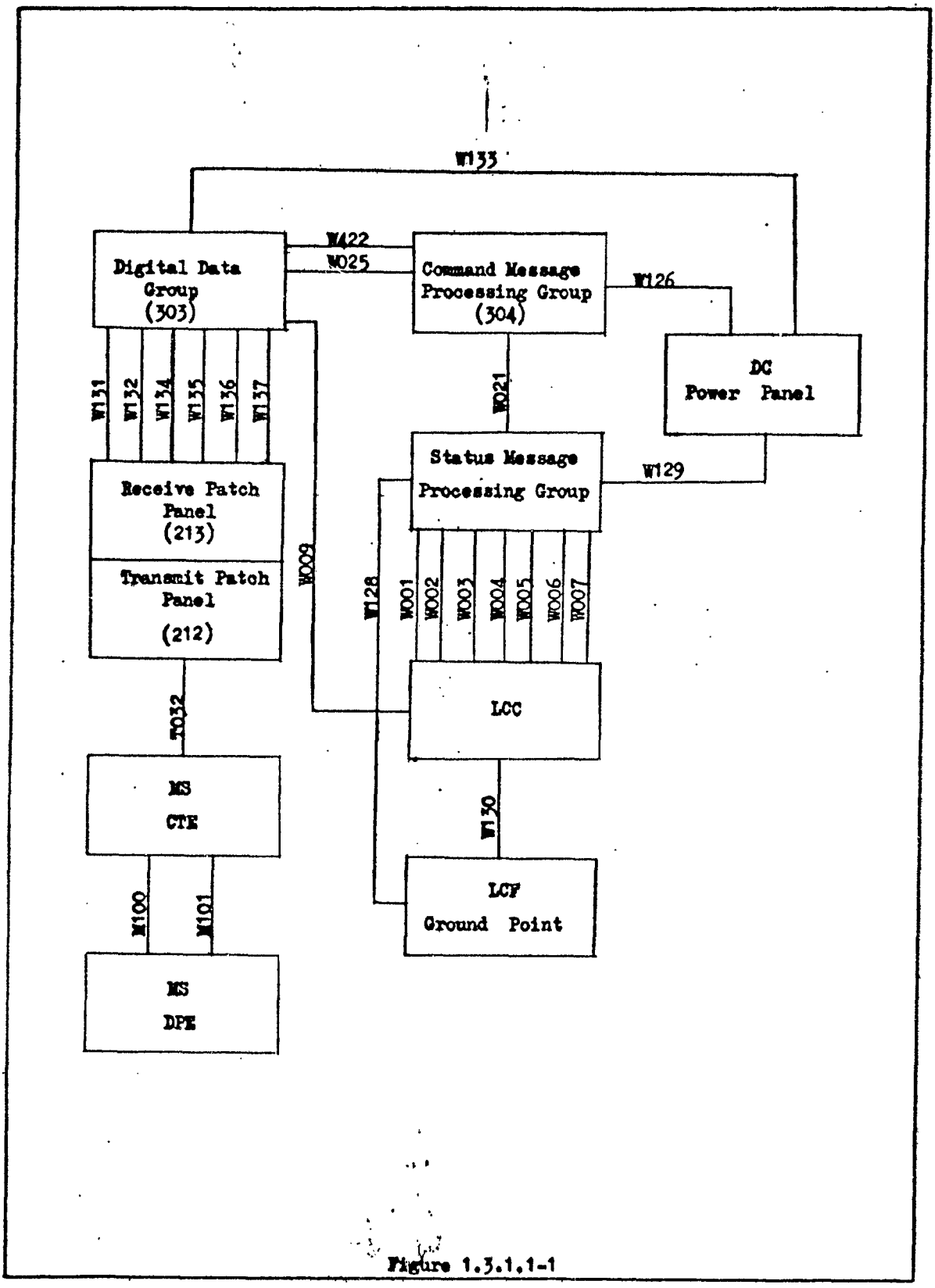


Figure 1.3.1.1-1

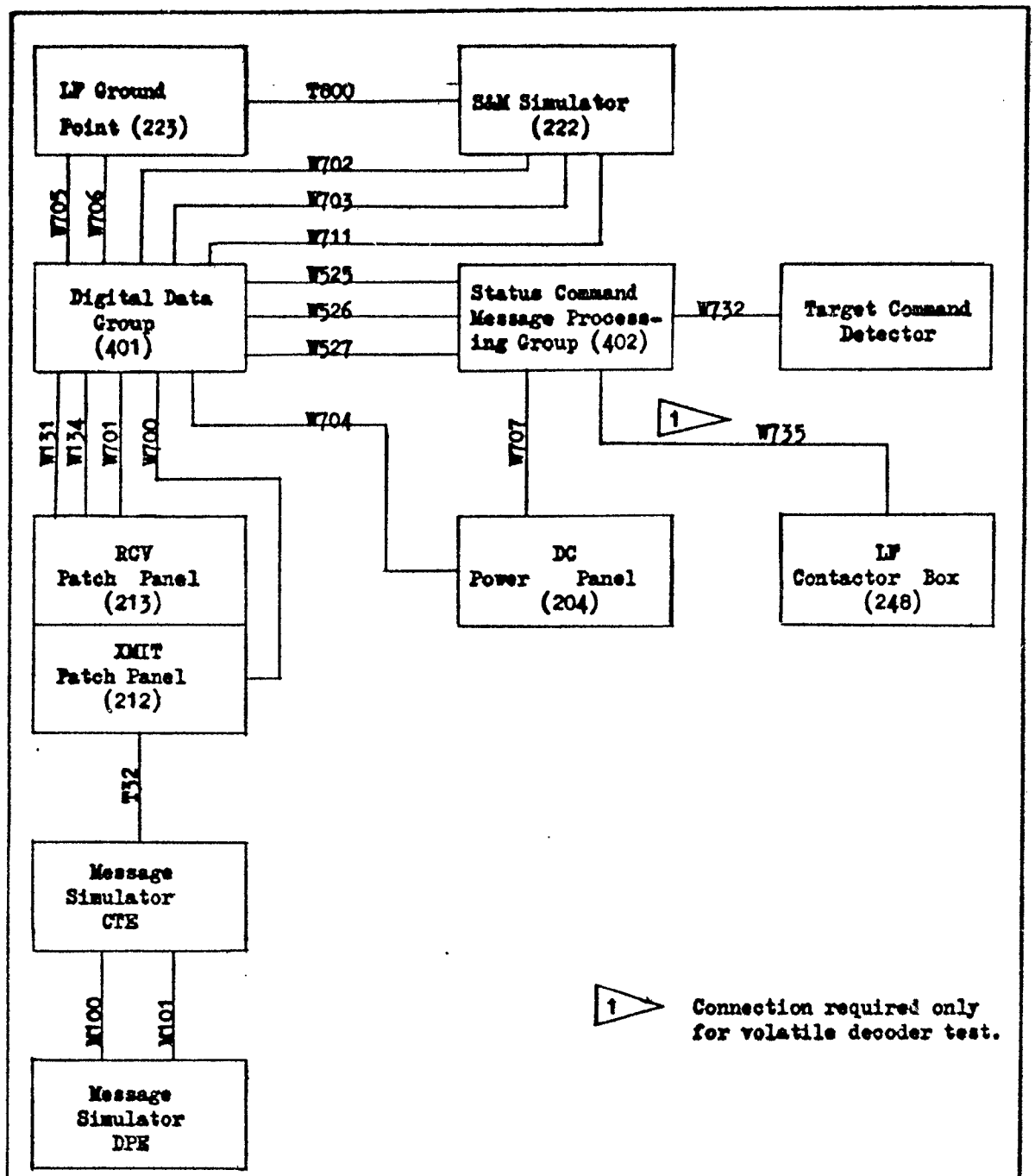


Figure 1.3.1.1-2

TEST MESSAGES BC-1 (BAC Dwg. 29-24771)

TEST - 0 0 0 0 0 0 1 1 0 1 0 LF ADD

CALIBRATE - 0 0 0 0 0 0 1 1 0 0 0

SCN TEST - 0 0 0 0 0 0 1 1 1 0 0

TARGET 1 - 0 0 0 0 0 0 1 0 0 1 1

TARGET 2 - 0 0 0 0 0 0 1 0 1 0 1

TEST LIGHTKIT - 0 0 0 0 0 0 1 1 1 1 1 0 0 0 0 1 0 0 0 0 0 1 0 0 0 1 0 1 0 0 0 0 0
1 0 1 0 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 0 1

TEST LAUNCH
LCF #1 - 0 0 0 0 0 0 1 1 1 1 1 0 1 0 0 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 1
LCF #2 - 0 0 0 0 0 0 1 1 1 1 1 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 1 0 1 0 1
LCF #3 - 0 0 0 0 0 0 1 1 1 1 1 0 1 0 0 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 1
LCF #4 - 0 0 0 0 0 0 1 1 1 1 1 0 1 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 0 1
LCF #5 - 0 0 0 0 0 0 1 1 1 1 1 0 1 0 0 0 0 0 1 0 0 0 0 0 1 0 0 0 0 0 1 0 0 1 1

FIRE CODE Bit 37- - - - - - - - - - - - - - - - -54
1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1

	Bit 55	56
MOLE A	1	1
MODE B	0	1

Figure 1.3.1.1-3

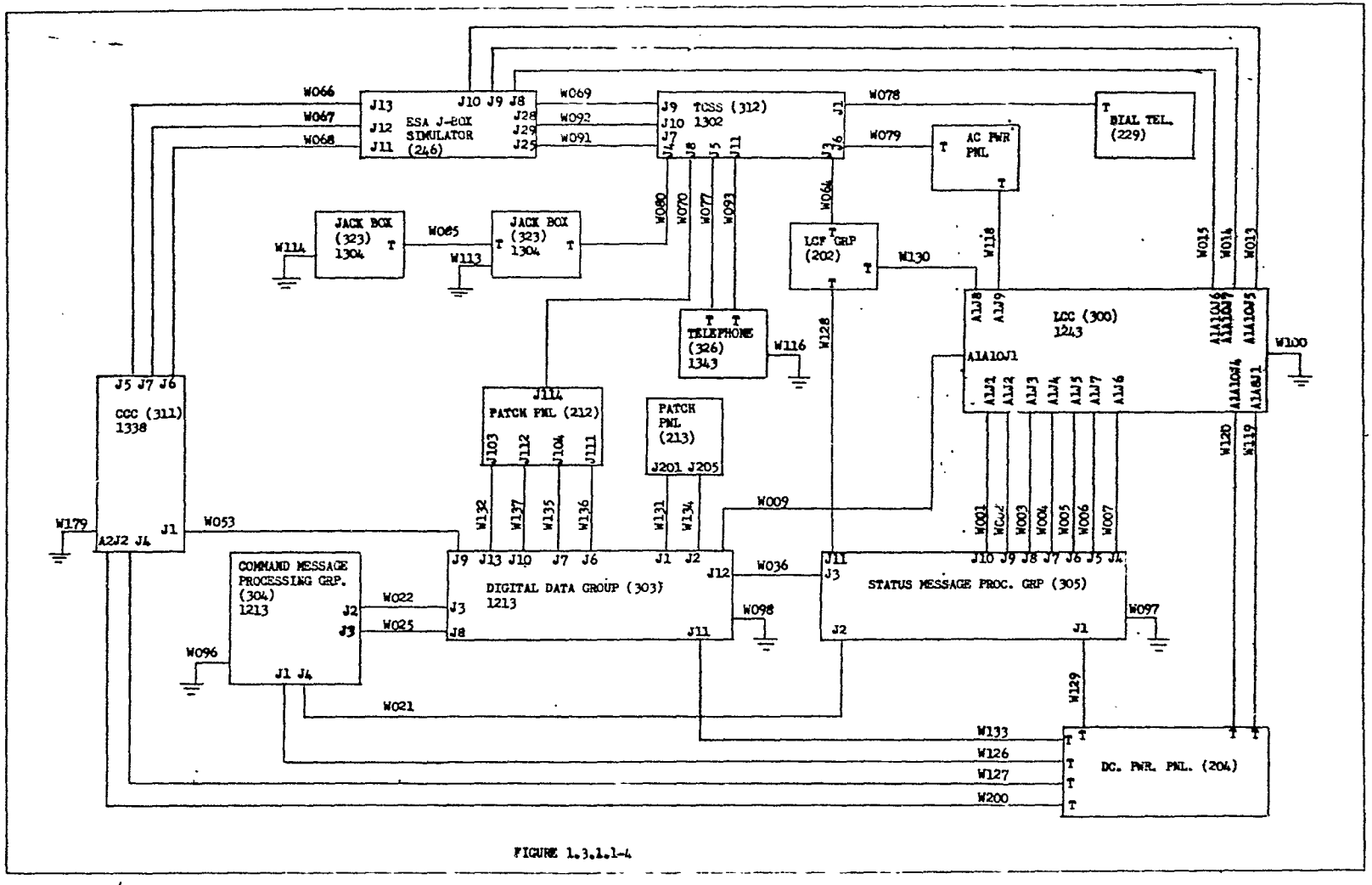


FIGURE 1.3.1.1-4

REVISED 10/24/62

BAC 4330

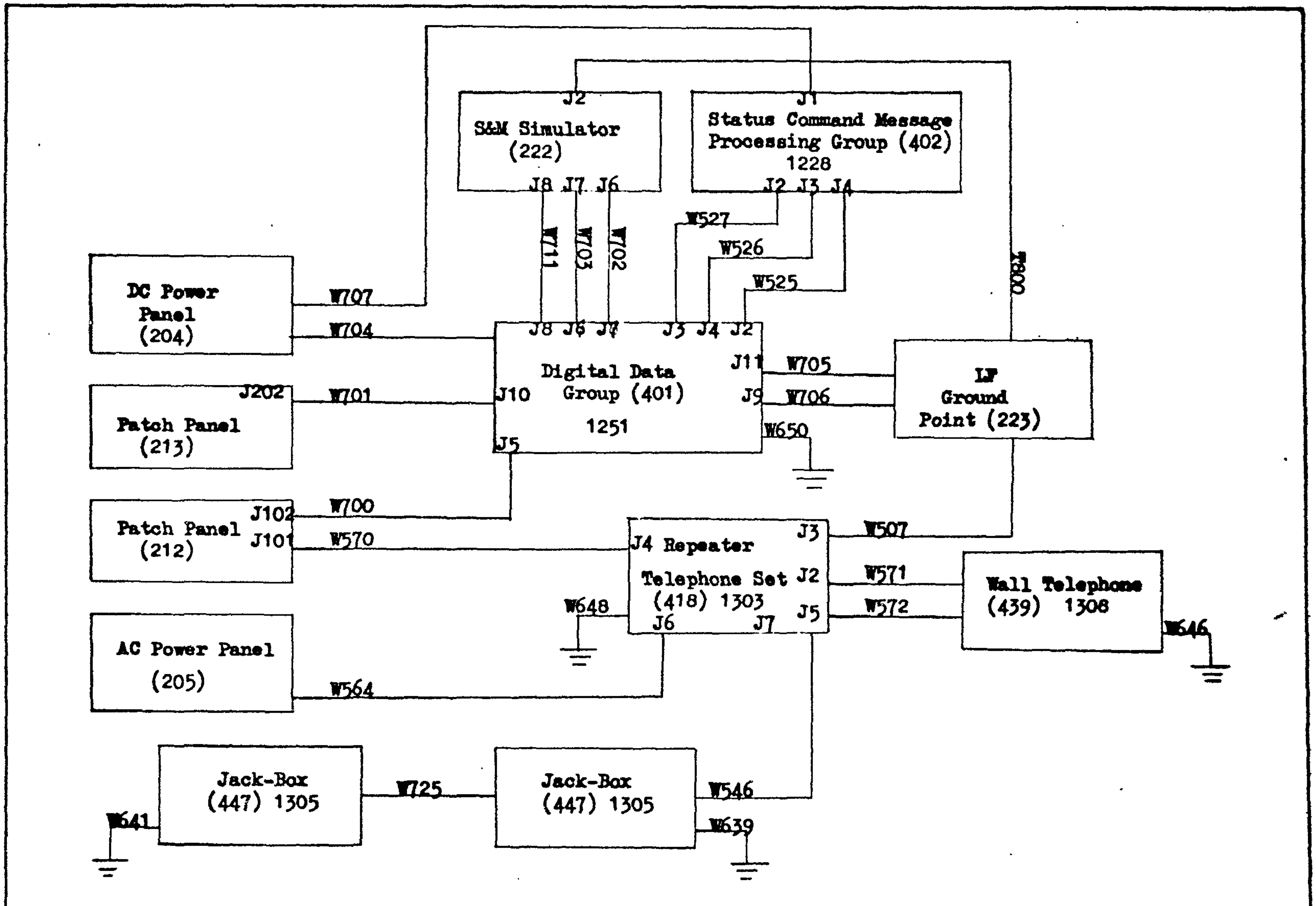


Figure 1.3.1.1-5

TEST 1.3.1.9

1. Title

   Equalizer Test, Simulated Short Lines

2. Objectives

   To determine the effects of transmission across short copper paths.

   To determine the effects of the 12 db pad used in the lines at VAFB.

3. Description

   3.1 Connect the equipment per Figure 1.3.1.9-1.

   3.2 Program the Message Simulator to generate all marks.

   3.3 Set R_1 to 127 ohms and record waveforms at A', A'' and A'''.

   3.4 Repeat 3.3 with R_1 disconnected.

   3.5 Repeat 3.4 using an LCF #1 LAUNCH A Test Code. (See Fig. 1.3.1.1-3).

   3.6 Reconnect R_1 and repeat step 3.5.

   3.7 Insert the 12 db pad between MX_1 and the cable simulator and repeat above steps, recording waveforms at A', A'', A''' and A''''.

4. Equipment in Test

   4.1 Attenuator - Balanced, Assy of 29-26032-1

   4.2 Message Simulator, Digital Data 25-29584-1

   4.3 Patch Panel and Cable Simulator 25-29327-1

   4.4 Repeat Coil Assy EED&I 71-1/SK 51

   4.5 Equalizer Simulator Assy EED&I 71-1/SK 52

   4.6 One Mile Simulator EED&I 71-1/SK 50

5. Test Equipment Required

   5.1 Oscilloscope, Tektronix 555 or 545A with differential preamp

   5.2 Oscilloscope camera

6. Data Requirements

Photograph waveforms for all steps, using calibrated scales. Record peak-to-peak voltages in the Test Log.

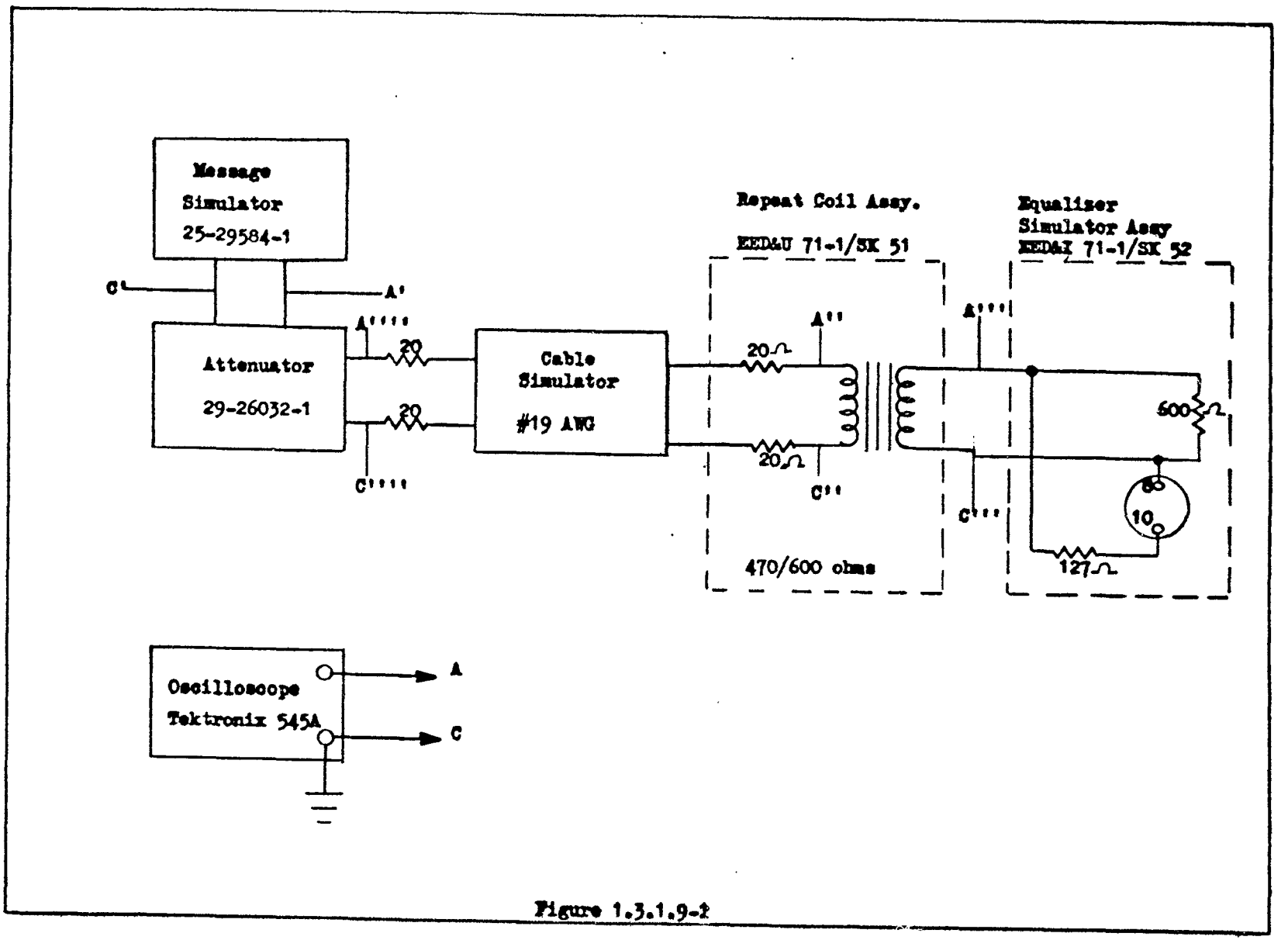


Figure 1.3.1.9-2

TEST 1.3.1.11

1. Title

   Verification of Line Equalizer Adjustment.

2. Objectives

   2.1 To verify that the SCN equalizer settings proposed in RCA document MTDR-C-019A will equalize lines in accordance with the Model Specification D2-12003.

   2.2 To verify that the SCN equalizer settings proposed in MTDR-C-019A are satisfactory for the SIN line.

   2.3 To establish new equalizer settings provided the Model Specifications are not met using the RCA settings.

3. Description

   A SCN Line Tests

   3.1 Connect the equipment as shown in Figure 1.3.1.11-1.

   3.2 Monitor diphase signals on pins 3 and 4 of the LMU Receiver Filter No. 1.

   3.3 Use drawer extension cables on 401/A2. Remove bottom cover of drawer.

   3.4 Turn on LCF and LF.

   3.5 Photograph waveform of marks from LCF. Monitor at C_2X_1. LCF should be transmitting all marks.

   3.6 Using 19 AWG cable simulator, determine the values of resistance (Re) for 20%, 0%, and 40% tilt for each of the cable lengths specified in Table 1.3.1.11-1. Vary the resistance by changing straps on Equalizer No. 1 (See Figure 1.3.1.11-3).

3.7 Shut down LF.

3.8 Change strap on repeat coil strapping board from position "B" to position "A".

3.9 Repeat 3.5 using 16 AWG Cable Simulators.

3.10 Shut down LCF and LF.

3.11 Return equalizer and repeat coil strapping boards to original configuration.

B SIN LINE TESTS

3.1 Connect the equipment as shown in Figure 1.3.1.11-2.

3.2 Monitor SIN line at 401/A3 J1-AA and J1-BB.

3.3 Use drawer extension cable on detector drawer, (401/A3). Remove bottom cover on drawer to gain access to equalizer strapping board.

3.4 Turn on audio oscillator and set output to a value between 6 and 9 V p-p at 1000 cps.

3.5 Using 19 AWG Cable Simulators, determine the values of series resistance for the frequency response conditions given in Table 1.3.1.11-2. Use the response at 1000 cps as reference. Measure also the response at 300 cps for each condition. At 3.1 KC and 0.3 KC, adjust line input voltage to the 1 KC value read for each resistance.

3.6 Repeat 3.5 for 16 AWG Cable Simulators.

4. Equipment in Test

4.1 LF/CTE Digital Data Group P/N 8323616-502 S/N 0000005

4.2 LF/DPE Command Message Processing Group P/N 8323562-501 S/N 0000004

4.3 LCF/CTE (303) Digital Data Group P/N 8323562-501 S/N 0000004

4.4 LCF/DPE (304) Common Message Processing Group P/N 8323614-501
S/N 0000005

4.5 LCF/DPE (305) Status Message Processing Group P/N 8323615-501
S/N 0000004

5. Test Equipment Required

5.1 Oscilloscope - Tektronix Model 545

5.2 Audio Oscillator - Hewlett-Packard 200CD

5.3 VTVM - Hewlett-Packard 400D

6. Data Requirements

Record all data in Test Log.

SCN LINE TESTS

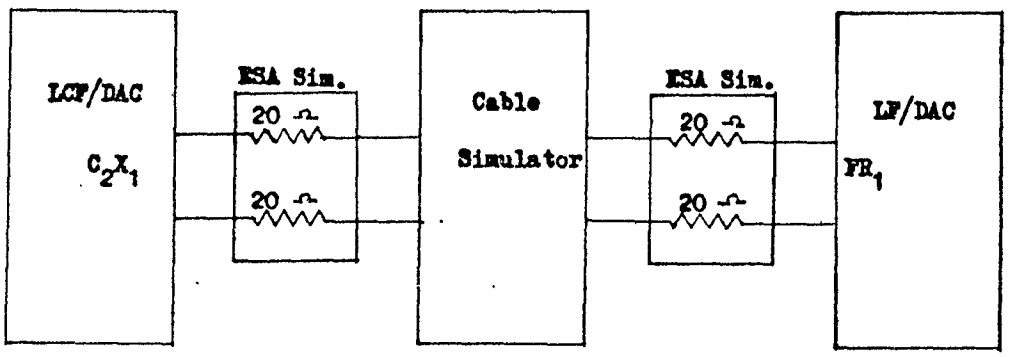
Line Size	Line Length	Resistance (for +20% Tilt)	Resistance (for 0% Tilt)	Resistance (for +40% Tilt)
#19AWG	6 mi.			
"	10 mi.			
"	13 mi.			
"	17 mi			
"	23 mi.			
#16AWG	20 mi.			
"	30 mi.			
"	40 mi.			
"	43 mi.			
"	48 mi.			

Table 1.3.1.11-1

SIN LINE TESTS

Line Size	Line Length	Flat Response from 1 KC to 3.1 KC		+2 db Rise from 1 KC to 3 KC		-2 db Drop from 1 KC to 2 KC	
		Resistance	Response at 300 cps	Resistance	Response at 300 cps	Resistance	Response at 300 cps
#19 AWG	6 mi.						
"	17 mi.						
"	23 mi.						
#16 AWG	6 mi.						
"	17 mi.						
"	23 mi.						

Table 1.3.1.11-2



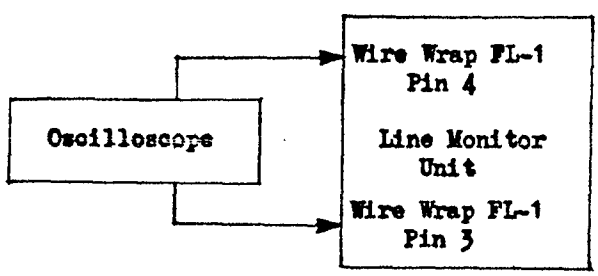


Figure 1.3.1.11-1

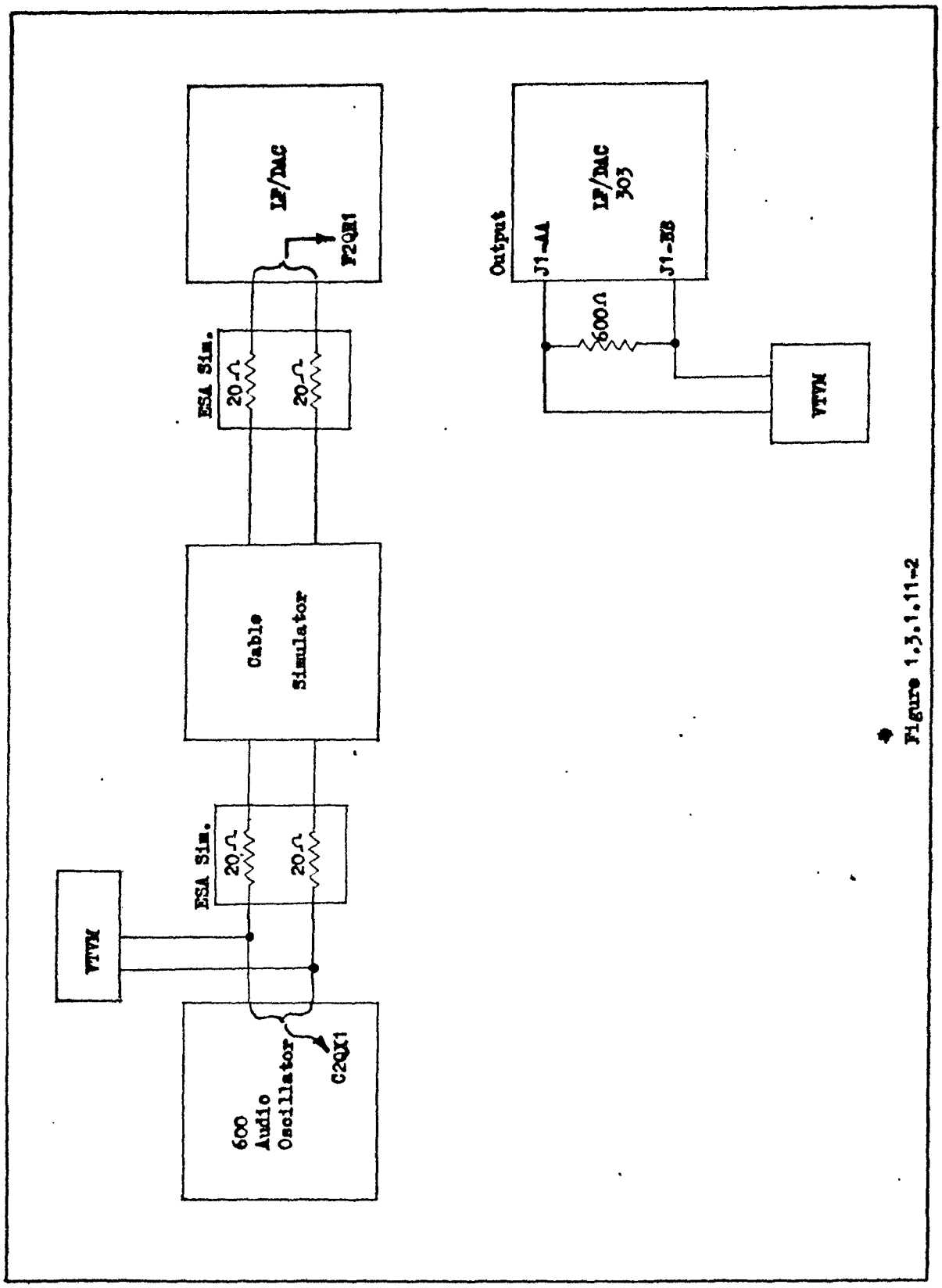
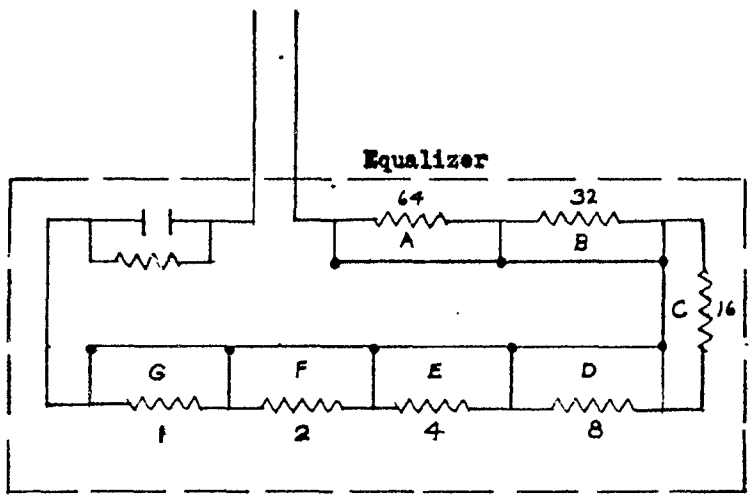


Figure 1.3.1.11-2



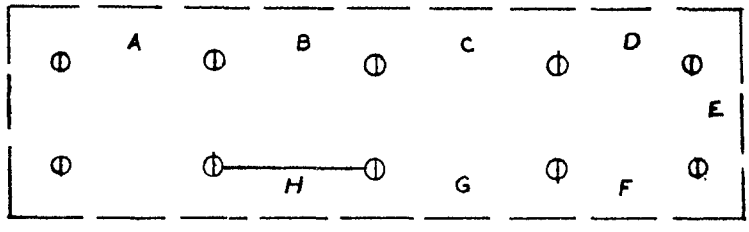


Figure 1.3.1.11-3

TEST 1.3.2.1

1. Title

   SIN Integration, Ring & Voice

2. Objectives

   To verify functionally the operation of the SIN voice and ringing circuits between the LCC, CCC, and the LF.

3. Description

   3.1 Connect the equipment per Figures 1.3.1.1-4, 1.3.1.1-5, and 1.3.2.1-1.

   3.2 Turn on all equipment.

   3.3 Release all buttons at the Communication Control Console (CCC) and Launch Control Console (LCC) Communication panels. Place the MIKE SWITCH in the TEL position at the LCC and CCC.

   3.4 Depress the upper OPR button at the LCC. Depress LF3 button. The LF3 lamps at both the LCC and CCC shall commence flashing. The buzzer at the LF Wall Phone shall sound.

   3.5 Lift the handset at the wall phone from its cradle and verify that the buzzer stops. The LF3 button lamps at the communication panels shall stop flashing and remain ON.

   3.6 Replace the handle in its cradle and release the buttons at the LCC.

   3.7 Repeat steps 3.4, 3.5, with the Interphone Switch in the IN position.

   3.8 Repeat 3.6.

   3.9 Repeat steps 3.4 and 3.5, but initiate the ringing from the CCC. Turn the VOL control counter clockwise.

3.10 Repeat 3.6.

3.11 Depress the upper OPR button and attempt ringing all other LF lines to verify that these are not detected at the LF.

3.12 Repeat 3.6.

3.13 Lift the handset from its cradle at the LF Wall Phone. The LF3 lamp at the LCC and CCC shall commence flashing and an audible alarm shall sound.

3.14 Depress the LF3 and upper OPR buttons at the LCC. The audible alarm shall cease and the lamp shall light continuously.

3.15 Release the buttons at the LCC.

3.16 Depress the LF3 and upper OPR buttons at the CCC. The audible alarm shall cease and the lamp shall light continously.

3.17 Verify voice communications between the LF Wall Phone and the LCC handset and the CCC handset with the LF Wall Phone Interphone switch in the OUT position.

3.18 With the LF Wall Phone Interphone Switch in the IN position, verify voice communications between the LCC or CCC and the LF Wall Phone handset, and each interphone jack box.

3.19 Throw the Interphone switch to the OUT position.

3.20 Talk between the two LF Interphone jack boxes.

3.21 Verify that this cannot be heard by the LF Wall phone; nor can the Wall phone to LCC conversation be heard by the interphone.

3.22 Turn the VOL. control clockwise to increase the VOL. Talk between the LF Wall Phone and the LCF. The voice should be clearly audible without encountering feedback.

4. Equipment in Test

4.1	Launch Control Console	25-24172-11
4.2	LCF Data Analysis Central	AN/GYK-1
4.3	LF Data Analysis Central	AN/GYK-2
4.4	Telephone Connecting & Switching Set	AN/GTC-8
4.5	Repeater, Telephone Set	AN/GTC-10
4.6	Jack Box (SIN/LF)	J-1308/GTC-8
4.7	LF Wall Phone	TA 466/GTC-8
4.8	Interphone Headset	Fig. A 4144
4.9	Patch Panel & Cable Simulators	25-29327-1
4.10	LCF Wall Phone	TA 462/GTC-8

5. Test Equipment Required

None

6. Data Requirements

Record all observations in the Test Log.

7. References

RCA Dwg. 1272051	LF Wall Phone Schematic
RCA Dwg. 1272052	SCC Phone Schematic
RCA Dwg. 1274072	CCP Schematic
RCA Dwg. 1274154	LF Repeater Telephone Set
RCA Dwg. 1274155	LCF Telephone Connecting and Switching Set
RCA Dwg. 1274184	

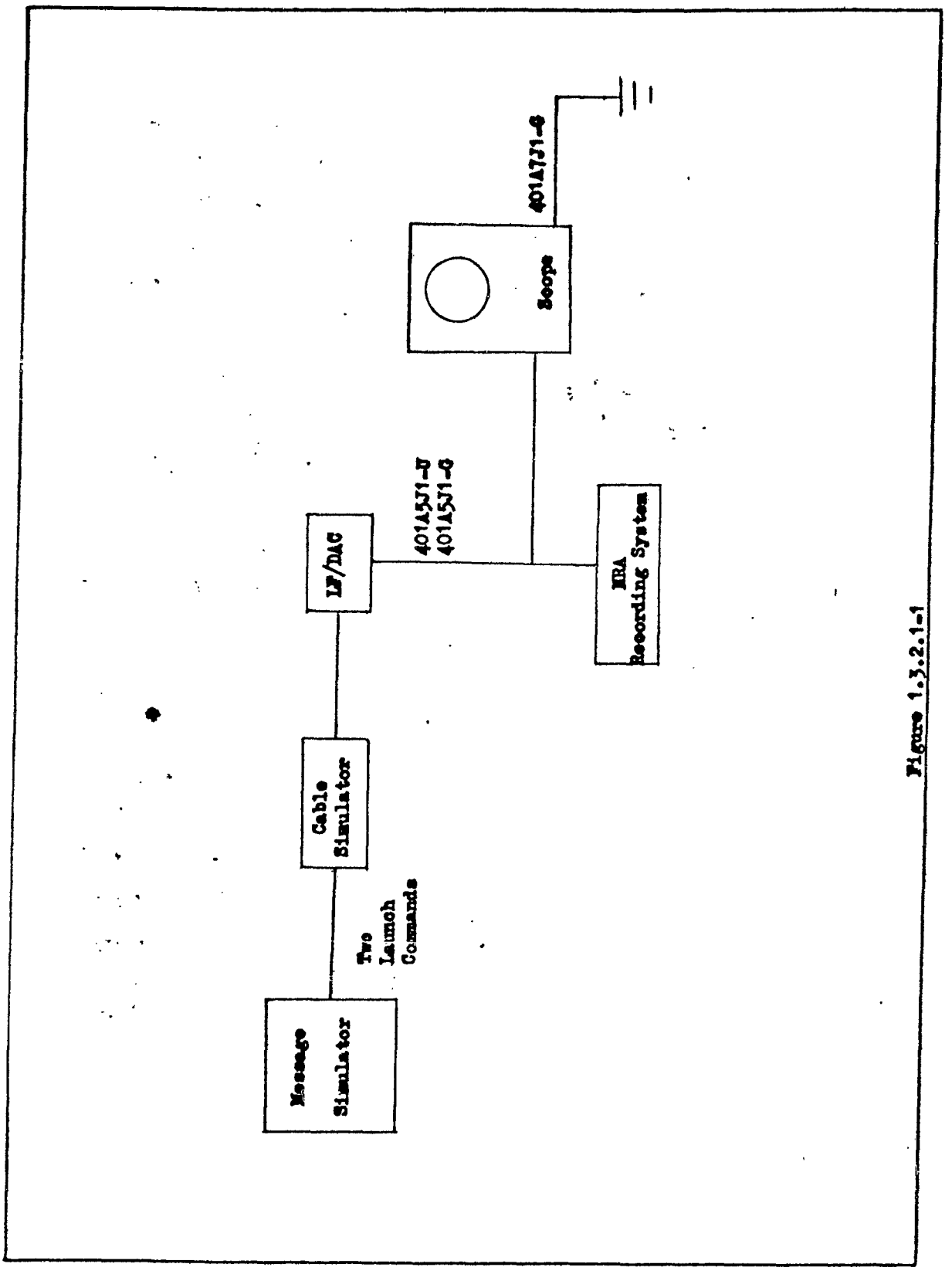


Figure 1.3.2.1-1

TEST 1.3.3.1

1. Title

Single Thread Test Procedures - SCN, Network Resolution Area (NRA),

2. Document D2-14330

2. Objectives

2.1 The primary objective of this test is to verify that the WG09 and WG10 configurations of the Network Resolution Area are acceptable for integration with STP·III Test Program.

2.2 Acceptance will be verified by satisfactory performance per document D2-14330.

2.3 In general, the test will verify the acceptance of the following items:

2.3.1 Cabling System

2.3.2 Cooling System

2.3.3 Patching System

2.3.4 Equipment Power

2.3.5 Message Simulator

2.3.6 S&M Signal Simulator

2.3.7 SCN Equipment

2.3.8 SIN Equipment

2.3.9 HVC Equipment

3. Description

The test procedure will be performed in accordance with document D2-14330. The entire test is to be conducted under surveillance by QC (Quality Control" assigned to the Network Resolution Area.

4. Equipment in Test

The equipment in test is as prescribed in D2-14330, paragraph 3.1.

5. Test Equipment Required

5.1 Oscilloscope - Tektronix 545

5.2 Stopwatches (3)

6. Data Requirements

The subject test will be recorded on M&IR Test Log provided by Planning (Dept. 2-3660).

7. References

See D2-14330, paragraph 2.1.